

Bjork's Seven Study Techniques

- One area of research in the field of Cognitive Psychology is human learning and memory. The following information comes from decades of research by Cognitive Psychologists on how to best acquire new information.

So you want to improve your studying, learning of a new a skill, teaching, or coaching?

- If you answered OH YES to the question above, then today is your lucky day.
- Many businesses offer expensive courses, weekend seminars, and books dedicated to the topic of "improving your memory".
- Well, I'm about to tell you how to help yourself to your best performance, and it's FREE!
- If you're worrying that free advice is often over priced, be reassured! What I'm about to tell you comes from decades of research on learning and memory conducted by some of the most influential scientists of our time.

Bjork's Seven Study/Teaching/Learning Techniques

- The decades of research was synthesized into 7 Effective Study Techniques by Dr. Robert Bjork, Professor of Psychology, University of California, Los Angeles.
- I first heard Dr. Bjork lecture on the topic of effective teaching, in 1989, to a group of professors and graduate students at UCLA.
- Also, I was fortunate to have both Dr. Bjorks (Bob and his wife Elizabeth) as my dissertation advisors while I was earning my Ph.D. at UCLA. During this time, I repeatedly experienced first hand the effectiveness of these study/teaching techniques.
- The following presentation is based on Dr. Bjork's lecture.

Outline of the 7 Techniques

1. Allocate your attention efficiently.
2. Interpret and elaborate on what you are trying to learn.
3. Make your studying variable (e.g., location, interpretations, examples)
4. Space your studying of a topic or area and repeat your study several times.
5. Organize and structure the information that you are trying to learn.
6. Visualize the information. Reinstate the context during a test.
7. GENERATE, GENERATE, GENERATE, RETRIEVE, RETRIEVE, RETRIEVE!!

1. Allocating Attention.

- Pay Attention!!
- So you might be thinking, ok I'm going to stop now if all she is going to tell me is to pay attention!! Who doesn't know that, right?

Attention (cont.)

- Yeah right, but I bet there's not one of you (me too) who hasn't had the experience of "reading" several pages of text only to discover that in this case reading meant running your eyes over the words without any comprehension of the meaning of those words.
- And, perhaps you've had the experience of sitting in a lecture only to discover that the professor is on a completely different topic from the one that she or he was on when you "tuned-out".
- Or have you ever practiced some skill while being completely on "auto-pilot" allowing your mind to wander?

Attention (cont.)

- I know you have, we all have! Yet we continue to study, teach, try to learn, practice and so on long after we've caught ourselves (or in the case of teaching, caught our students) slipping into semi-consciousness.
- If you feel yourself slipping right now. Stop! Stand-up, stretch, move your head from side to side, do like Winnie-the-Pooh: tap your head three times while muttering "think", "think", "think". Ok now refocus. Feel better?
- Well it's not that simple, but I got a kick out of imagining you doing all those things, so read on.

Attention (cont.)

- The decades of attention research have told us at least two things.
- 1. When you try to divide your attention between two tasks, one or both tasks WILL suffer.
- 2. There is a limit to the amount of time that one can sustain attention (concentrate).

Attention (cont.)

- So, let's take each one in turn to see how we can be more effective.
- 1. Divided attention is costly! Don't try to study and _____ (you fill in the blank). You really must stay focused on the primary task of learning, practicing, studying. If you find yourself being distracted, remove yourself from the distracting situation. Turn off the stereo, leave the coffee shop, tell yourself that if you study/practice for 20 min then you'll spend 5 minutes thinking about those distracting thoughts.

Attention (cont.)

- For lectures, give yourself a pep talk beforehand. Even the most boring lecture will end eventually. You must try to stay focused on what is being said. When you find yourself beginning to lose attention, refocus. Try to think of a question to ask the instructor.
- If you're teaching, you MUST first get your students' attention. (Hint: Droning on in monotones probably isn't the best way). Try to think of an interesting question to ask your students. Insert an active learning demonstration into your lecture. Tell a joke, an anecdote, or give a relevant real-world example.

Attention (cont.)

- 2. This brings us to the second point, a person can concentrate for a limited amount of time.
- The amount of time a person can sustain attention differs from person to person and from task to task.
- You will know when you've reached your limit because you will start to violate point 1, that is, your mind will start to wander.

Attention (cont.)

- I'll work through an example but of course you may need to vary the specifics depending on your own abilities and the type of task to which you are attending. (In general, the more difficult or more boring the task, the more breaks you will need.

Attention (cont.)

- Example: Let's say you have 50 minutes to study, practice, or to lecture.
- You will actually learn more, acquire more, or teach more by studying, practicing or teaching for 45 of those 50 minutes and taking a short break for 5 min.
- OK! I know. You DON'T have time for a break.

Attention (cont.)

- But, if YOU don't take a break, your brain will go on one without you anyway. And your brain might decide to go on break just when you're trying to learn/teach the most important part of the lesson.
- So for every 50 minutes, study, practice, or teach for 25, take a break for 5, and then start again for 20.

Attention (cont.)

- DON'T FORGET TO START AGAIN!
- For the next 50 min. time period, you will probably begin to notice diminishing returns from that 5 min. break. You might find that you need a 10 min. break.
- At the point when your breaks begin to be longer than your study sessions, take a siesta, hiatus, run around the block, swim, trip to the laundry,..... get the idea?

Attention (cont.)

- So my 5 year old is running around trying to see if he can get the dog to bite him, my 10 year old is watching Rocko's Modern Life at an ear piercing volume, and I've been at this now for over an hour. I guess that I've missed out on both points one and two. Time for a bread, that's break. You take one too, ok.

Interpretation and Elaboration

- Ok, I'm back and you must be back too, now on to the second study technique: Interpretation and Elaboration
- Read the following:
 - 1. The exposure was insufficient because of the weather conditions.
 - 2. The crash was due to the keys sticking.
 - 3. The numbers slid down because of the crisis abroad.

Interpretation and Elaboration (cont..)

- Interpretation can be thought of deep processing, whereas elaboration can be thought of as broad processing.
- What do I mean by this? I'll tell you later, but now try to recall the three sentences that you just read on the previous slide. DON'T GO BACK TO PEAK! Can you do it?

Interpretation and Elaboration (cont..)

- Remembering the sentences was most likely difficult for you.
- The sentences didn't make any sense.
- Because the sentences didn't make sense, you were unlikely to have been able to interpret them.

Interpretation and Elaboration (cont..)

- Read the sentences again:
 - 1. The exposure was insufficient because of the weather conditions. (Taking a picture)
 - 2. The crash was due to the keys sticking. (Computer break-down)
 - 3. The numbers slid down because of the crisis abroad. (Stock-market)

Interpretation and Elaboration (cont.)

- Again, interpretation can be thought of as deep processing, whereas elaboration can be thought of as broad processing.
- What do I mean by this? I'll tell you later, REALLY, but now try to recall the three sentences again. It's easier this time, right?

Interpretation and Elaboration (cont.)

- Ok, so you're thinking well of course it's easier I saw them before (repetition).
- Also, I tried to recall them once already (retrieval practice)
- Yes, that's true, repetition and retrieval practice are both important for learning, memory, and skill acquisition, but we'll get to that later, too.
- Research has shown that the sentences with the "clues" would have been easier to remember than the sentences without the "clues" even after having seen them only once, because you were able to **interpret** the sentences with the "clues".

Interpretation and Elaboration (cont.)

- Interpretation means really understanding what you're trying to learn, thinking deeply about the process that you're practicing, thoroughly comprehending the information being presented, and if you're teaching, using examples that make sense to your students.

Interpretation and Elaboration (cont.)

- If you don't understand, you won't learn, remember, or improve your performance.
- And, if you only kinda understand, you'll only kinda learn, remember, or improve.
- So how do you know if you thoroughly understand, or you only kinda understand?
- When you thoroughly understand you should be able to (part 2) elaborate.

Interpretation and Elaboration

- Elaboration provides breadth of processing.
- You should be able to come up with how the book information is related to what you learned in lecture (same as **and** different from), or how what you learned in lecture relates to something that you have observed directly.
- Perhaps the content from two different courses can be compared or contrasted.

Interpretation and Elaboration

- When you practice, you should be able to relate parts of the movements or musical piece to one another.
- When you teach, you should use several examples. You should illustrate how the current lecture material fits with the previous lectures and with the information that will be coming in future lectures.
- And the great thing about **elaboration** is that it provides **variability**!!

Variation

- I just illustrated how elaboration relates to the next study technique: variability. Also, taking a study break provides variability. Thus, I'm trying to illustrate how what came before relates to the current point. Can you find any other study techniques incorporated in this presentation? Now I'm asking you to generate (the 7th study technique). See, I practice what I preach!

Variation

- Have you ever been told to pick a single quiet place and then to always study in that same place?? That way you will become "accustomed" to studying there and will be more effective, right?
- **WRONG!!!**
- Actually, the opposite is true. You're better off studying in many different locations.

Variation

- I bet I got your attention with that one.
- Are you thinking, all right! She's finally telling me something that I can use. No problem, I'll be happy to study all over campus, I'll practice everywhere, I'll teach my class outside occasionally.
- The rest of the stuff she's been talking about sounded like it would take forever!!
- I'll just study in different locations.

Variation

- Oh, I forgot to mention, the size of the increase in performance that you will see as a result of changing your study locations (without any other changes in your study behavior) is MINISCULE!
- A much better way to increase your performance is to incorporate variation in the way that you think about the material.

Variation

- Play the musical piece at a number of different tempos.
- Make the shot from several different locations on the court.
- Present the most critical information across several different lectures.
- Think about the material in a number of different ways.

Variation

- Doesn't this sound like elaboration?
- I told you that elaboration produces variation. Guess what! Variation produces...
- You got it, elaboration!
- One way to increase variation in the way that you think about the information, is to space your study.
- Which brings us to the 4th study technique: Spacing

Spacing and Repetition

- You have 2 hours to study for two tests, one in Class A the other in Class B. What do you do?
- Buy a time machine and travel back in time. Then, manage your time better, so that you can have a more reasonable amount of time to study for those tests!!
- Ok, now you have 4 hours to study for those tests (you need to work on that time management thing).

Spacing and Repetition

- What do you do?
- Do you spend two hours on Course A and then two hours on Course B?
- I don't think so, or this study point would be called massing.
- You're much better off studying Course A for an hour, then Course B for an hour, then Course A for an hour, then Course B.

Spacing and Repetition

- Spacing your study in this way is an easy way to increase variability (again, increasing elaboration).
- The chances of you continuing to think about a topic only in one way decreases when you space your study.
- Spacing your study in this way is an easy way to increase variability (again, increasing elaboration).

Spacing and Repetition

- Oh no! She's losing it. Now she's starting to repeat herself (not to mention writing in the third person). She needs an attention break.
- Well yea, but also I'm trying to illustrate the point that each time you study something, you will encode the information somewhat differently.
- Especially when time intervenes between the two study sessions.

Spacing and Repetition

- Also, you need to study the same information more than once, hence the repetition.
- Spacing your study is an easy way to increase variability (again, increasing elaboration).
- Just a bit more of practicing what I preach.

Organization and Structure

- So onto the 5th point.
- List the months of the year.
- How long did that take you?
- Did you get them all?
- Pretty trivial, huh?
- Now list the months of the year alphabetically?
- How long did that take?
- Are you sure that you got them all?

Organization and Structure

- So with that little demo under your belt, can you think what I'm going to tell you about the importance of organization and structure?
- If you spend sometime trying to figure out what I'm about to say, you'll learn them better that way. It's called generation. I know I said that before (that's called repetition). It's been a while though, that's called spacing and we all know: Spacing your study is an easy way to increase variability (again, increasing elaboration).

Organization and Structure (cont.)

- When I was an undergrad I really could have used the following advice myself.
- Whenever I sat down to read a chapter from my textbook I'd just sit down and start reading. I never previewed the chapters by looking over the section headings to see what the author's organization of the chapter was.
- How many of you read the chapter summaries at the beginning of the chapters before you begin reading?

Organization and Structure (cont.)

- Do you put outlines up on a view graph before you begin lecturing so that your students will know the organization of your lectures?
- I know, who has that kind of time? Best just to begin.
- But remember the experience of trying to recall the months of the year in alphabetical order? Without the months being organized that way in your memory, it was very difficult.
- So give yourself a break. Notice the organization provided to you by the author, lecturer, coach, etc.

Organization and Structure (cont.)

- If you are the author, lecturer, coach give your students a break and provide them with an outline.
- Before you begin reading the chapter, flip through the chapter noticing the paragraph headings and sub-headings as well as the words in bold. Look at the graphs and pictures.

Organization and Structure (cont.)

- After reading the chapter, hearing the lecture, practicing the task take time to structure the information in a way that is most meaningful to you. Did you find that the author's organization worked best? If so, why did it work for you? If not, how could you organize the information better?
- After your lecture, recap/review the main points paying particular attention to emphasizing how the points fit together.

Visualization and Mental Reinstatement

- Of all the study techniques, this one is probably the most familiar. I'm sure that many of you have learned one or two mnemonic techniques already.
- Most mnemonic techniques take advantage of the power of visualization.
- For those of you who haven't mastered a technique, I'll teach you one now.
- You'll need three sheets of paper and a pen or pencil. I'll wait while you get them.

Visualization and Mental Reinstatement (cont.)

- On the next slide is a list of words. Try to learn them. Spend about 3 seconds per word.
- Don't write the words down. You'll get to use the pen and paper in a bit.

Visualization and Mental Reinstatement (cont.)

Try to learn this list of 18 words by reading through them once.

- oil
- baseball
- ruler
- coat
- chisel
- rock
- hail
- plain
- dress
- football
- gas
- snow
- coal
- screwdriver
- hat
- sleet
- river
- basketball

Visualization and Mental Reinstatement (cont.)

- Ok now write down all the words that you can remember.
- When you think that you can't get anymore, you may turn back to the previous page to check your recall.
- How many did you get?

Visualization and Mental Reinstatement (cont.)

- Now I'm going to teach you a mnemonic technique know as the Method of Loci.
- Think of any well know route that you take regularly. For example, start in your room then leave your house/dorm go to Tappan square, think of stops along the way.
- On the route, take note of 18 distinct stopping places.

Visualization and Mental Reinstatement (cont.)

- On a new sheet of paper, write down the 18 stopping places along the route (if you use this technique often you will soon be able to use it without the written cues).
- For the next list of items that I'm going to give you, visualize the item/concept in each of the 18 locations. You may look at the location list, but DON'T write down the words to be learned.

Visualization and Mental Reinstatement (cont.)

- For example, let's say that I was trying to remember a shopping list and I needed to buy salt, bread, and tomatoes. If the first stop on my list was my bedroom then I'd imagine two giant salt shakers for pillows in my bed. If the next stop was my driveway, then I'd imagine not being able to get the car out of the drive because it was made of soft bread.

Visualization and Mental Reinstatement (cont.)

- I'm sure you have the idea by now. The more outrageous, weird, or funny the image, the better.
- So if you've written your location list, forward to the next slide and try to learn the list.

Visualization and Mental Reinstatement (cont.)

- | | |
|------------|-------------|
| • wood | • tennis |
| • gasoline | • swimming |
| • paper | • soccer |
| • hammer | • hurricane |
| • saw | • tornado |
| • nails | • rain |
| • mountain | • shirt |
| • hill | • dress |
| • valley | • hat |

Visualization and Mental Reinstatement (cont.)

- Now try to recall the second set of 18 words. You may do the recall on the sheet of paper with the 18 locations listed.
- Check back.
- How many did you get this time?
- Most people recall all 18 items when using the mnemonic technique.
- Visualization is a very powerful study technique, which is limited only by the creativity of the learner.

Visualization and Mental Reinstatement (cont.)

- Digressing for a moment, you may have noticed, also, the organization of the second list. Even if you didn't use the mnemonic, the second list would have been easier to learn because it was organized by category (just a bit of spacing and repetition).
- Visualization can also be used as an effective practice technique.

Visualization and Mental Reinstatement (cont.)

- You can visualize yourself playing the musical piece that you're about to perform, or hitting the ball, or making the shot.
- You can visualize yourself in the location that you will take the test while you're studying the night before.
- During the test, you can mentally reinstate the context you were in while you studied for the exam. If you can't remember a word or concept while taking the exam, don't panic! Think back to the context in which you were studying. What other things were happening at the time? What other things were you learning?
- You can mentally reinstate both the physical and mental contexts that you were in while studying.

Visualization and Mental Reinstatement (cont.)

- If you are a coach or teacher, provide opportunities for your students to visualize the skill or material that you are trying to teach.
- During lectures, provide tools that help students to visualize the concepts being presented. Graphs, props, and demonstrations can all provide opportunities to visualize the material.

Generate, generate, generate, Retrieve, retrieve, retrieve!

- It's well known that people will tend to remember the first thing that they learn and the last thing that they learn (these effects are known as primacy and recency). That's why I presented the two most important points first (attention) and last (generation and retrieval practice) in the presentation.
- If I had to pick one point that I think is the most important to use and master it would be this last one: Generation and retrieval practice.

Generate, generate, generate, Retrieve, retrieve, retrieve!

- Ok for those of you who know me really well, stop laughing! I didn't pick this point as the most important simply because it's been my research area now for more years than I care to admit. It really is the most important, really!
- By generating (or producing the information) before the textbook, instructor, or coach can tell you that same information, the better able you'll be to gauge how much you already know or don't know.

Generate, generate, generate, Retrieve, retrieve, retrieve!

- Guess what, even if you generate the wrong answers, you'll remember the right ones better after correcting yourself than if you never attempted to generate the information before.
- So when you flip through your textbook taking note of the organization before you begin to read the chapter, try to generate the details of each of the chapter subheadings. For example...

Generate, generate, generate, Retrieve, retrieve, retrieve!

- Let's say you are preparing to read the second chapter of a cognitive textbook. The chapter is entitled "Perceptual Processes". The first sub-heading is entitled "The Sensory Register". Try coming up with what you think the sensory register is all about. Generate the meaning of the concept.
- Sensory: must be something about the senses.
- Register: must be something about keeping a record (of the senses!).
- If you could do that before you even studied the chapter, you could certainly do it on the test!

**Generate, generate, generate,
Retrieve, retrieve, retrieve!**

- The next subheading is entitled "The Function of the Sensory Register". Try to generate what you think the function of a sensory storage system may be.
- Even if you were to generate the wrong function, once you correct yourself as you read through the chapter, you'll remember the correct function better than if you simply read about the function.

**Generate, generate, generate,
Retrieve, retrieve, retrieve!**

- Now that you're done previewing the chapter, how do you apply generation during the reading of the chapter.
- Step number one: Take out your highlighting pen.
- Step number two: Make sure your highlighter has plenty of ink.
- Step number three: Throw away your highlighter!!!

**Generate, generate, generate,
Retrieve, retrieve, retrieve!**

- I recently looked back to some of my textbooks from college. My first year textbooks were covered with highlighting ink. Just about every word in every chapter was highlighted! Why bother? Now if you're saying to yourself I've always used a highlighter and I've always done really well on test, good for you! But why are you wasting your time on this study techniques presentation if you're already doing really well? For those of you who aren't, throw it away NOW.

**Generate, generate, generate,
Retrieve, retrieve, retrieve!**

- You are much much much better off reading a paragraph or two at a time (more once you've practiced this skill and are good at it), then putting the textbook aside and generating a summary of the information that you've just read in your own words.
- Then, check the textbook to make sure that you have correctly summarized the information making any error corrections as needed and incorporating any information that you have left out.

**Generate, generate, generate,
Retrieve, retrieve, retrieve!**

- All the time, trying to make sense out of what you are learning (interpretation) and interconnecting what you are learning with other information (elaboration).
- You may be thinking STOP RIGHT THERE!!! You're talking about taking hours to read what would normally take me only about 30 minutes to run my eyes across.
- Yes, sadly it is true. Using this very powerful technique will double if not triple your reading time.

**Generate, generate, generate,
Retrieve, retrieve, retrieve!**

- But, when you sit down to study for the test, you'll discover that you already know most of the information. Also, when your grades start to improve, you'll be glad that you spent the extra time studying effectively (time spent studying only counts if it's spent studying well!!!).

Generate, generate, generate, Retrieve, retrieve, retrieve!

- Instructors can give their students opportunities to generate answers during lecture by asking questions and giving students TIME to answer the questions.
- If, the instructor asks a question, come up with an answer (even if it's wrong). You are much better off trying to answer the question yourself (generating) than taking a mental break while other students think up the answer.
- By the way, if you hope to have any chance of filling in gaps (generating) in your lecture notes, it's very important that soon after lecture you review your notes. You might remember something that the instructor said that you failed to include in your notes.

Generate, generate, generate, Retrieve, retrieve, retrieve!

- Now the second part of this most important point: retrieval practice.
- How will you know that you're ready to take the test, that all of your study efforts have been effective, and that you will do well on the exam?
PRACTICE RETRIEVING THE INFORMATION BEFORE THE TEST!!!

Generate, generate, generate, Retrieve, retrieve, retrieve!

- Retrieval practice provides very effective feedback. You will know immediately if you know the information or if you need to study it some more.
- Even better, retrieval practice makes the information more likely to be remembered the next time you try to retrieve it!

Generate, generate, generate, Retrieve, retrieve, retrieve!

- So, how do you do retrieval practice?
- Remember those notes you made while you read the textbook, and those wonderfully complete lecture notes? You can now use your notes to practice retrieving the information on the notes. ALL OF IT! Unless of course you're psychic and know what the instructor is planning for the test.

Generate, generate, generate, Retrieve, retrieve, retrieve!

- You practice retrieving the information by looking at keywords in the notes and then generation all of the information relating to those key words.
- Some people prefer to do this with 3 X 5 cards and call them flashcards.
- It doesn't matter if you use flashcards or review your notes what matters is that you don't simply read over your notes!!!

Generate, generate, generate, Retrieve, retrieve, retrieve!

- You must generate, **produce from memory**, all of the information that is contained within you notes.
- You won't have the notes during the test, so reading over them and saying yup I know that won't do you any good.
- Look at a keyword, e.g., Sensory Register, put away the notes and then practice retrieving everything in your notes about the sensory register.

Generate, generate, generate, Retrieve, retrieve, retrieve!

- You might discover that you know the definition of the sensory register, and its functions, but you could only recall three of its five characteristics. Next time through your notes you'll be much more likely to remember all five of the characteristics.
- You continue going through your notes or flashcards until you can correctly retrieve everything!!

Generate, generate, generate, Retrieve, retrieve, retrieve!

- So, you've been attending every time you've worked on the course. You've checked back with the textbook during your effective reading and you're sure that everything from the textbook is in your notes. You've reviewed your lecture notes filling in any gaps (getting help from the instructor if needed).

Generate, generate, generate, Retrieve, retrieve, retrieve!

- You've interpreted (made sure that you understood the concepts) and elaborated everything in your notes. You've thought about each concept in several different ways. You've used visual imagery when appropriate. You've noted the organization and structure of all chapters and lectures.

Generate, generate, generate, Retrieve, retrieve, retrieve!

- You've spaced your studying and retrieval practice allowing more and more space (time) between each study repetition. And the last several times that you went through your notes/flashcards, you were able to retrieve everything in those notes.
- **YOU ARE NOW READY TO TAKE THE TEST. Relax!**

A Few Words More.

- These study techniques are not magic pills!
- Your performance will not improve simply as a result of reading through this presentation.
- You will benefit from these study techniques only to the extent that you apply them, all of them.
- They are hard work and they take time.
- It's your education, you decide if it's worth spending some time on it.

Finally.....

- I've attempted to illustrate how these techniques could be applied to the acquisition of skills as well as information. At times, I focused more on the information (it's what I know best) than on the skills. Please don't interpret this as meaning that the particular point doesn't apply to skill acquisition, it does.
- Also, all the points can be effectively incorporated into teaching. Even retrieval practice. So, practice retrieving Bjork's 7 Study Techniques.
- Good luck!! All feedback is appreciated.
- Email me at Patty.deWinstanley@oberlin.edu