Hebb, D.O. (1972) Textbook of Psychology, 3rd edition. W. B. Saunders, Philadelphia pp. 4-5.

RESEARCH PROBLEMS: LEARNING

All the foregoing discussion is very general. It will have more meaning if we look now at some of the areas in which research is done. Psychologists do not spend all their time trying to settle outsize questions like what is the mind made of, or is there a soul. Their normal research deals with something easier to get at, such as learning, motivation, perception, intelligence or memory—all of which must be understood if we are to understand the mind.

The first and main area of research is learning. More than anything else, the mark of a psychologist is an interest in learning and what it can or cannot explain about behavior. Now learning may seem very simple to the student, who has been doing it all his life. What need for research? Learning is just a matter of repetition. Practice makes perfect. The oftener you catch a ball the better you are at catching it, the more you drive a car the better driver you become, and so on. The way to learn the stuff in this *Textbook* is to read it over and over; the more you read, the more you will remember—

Or will you? That last statement may sound reasonable, but it is a trap. Things are not so simple. There are other ways in which you will learn more and remember more. Human learning is very peculiar in a number of respects. We will come back to it in later chapters, but here we can look at some points to give the student an idea of how much there is still to find out about learning and how interesting it can be (even study methods).

Let's take a moment to look at study methods (for a fuller account, see p. 108). It is possibly true that the more you read this *Textbook,* the more you will remember of its content (but not if you simply try to read and the book sends you to sleep). But it is not true that this would be a sensible way to learn. You will get more results, with less pain, from a different method. Less than half your time should be spent taking in information, more than half making notes on the material or trying to reorganize it, or to recall it. For example:

Stop reading at this point and look through the whole of this first chapter, to find out if possible why the parts are arranged as they are. Read the headings, *sample* the text, look at the Summary, and see if the organization of the chapter makes sense. If not, sample more of the text, and try again. How would *you* organize these points? Instead of just reading and trying to remember (and as like as not daydreaming while you try to read), see if you can find out what the pattern of ideas is. And the peculiar thing about this is, that you will remember more by not trying to remember but just to understand. And another peculiar thing is, that this method is easier as well as more efficient. It's also easier to talk yourself into study when you do it this way. This is how you should approach a new chapter or a new book. Look for the main picture and the details will look after themselves, mostly.

*Demons are not necessarily evil. The Oxford English Dictionary quotes Shakespeare: "O Antony!... Thy Daemon.... thy spirit.... is Noble, Couragious, high unmatchable."

Hebb, D.O. (1972) Textbook of Psychology, 3rd edition. W.B. Saunders, Philadelphia p. 108-111.

STUDY METHOD

The theory of learning and memory as discussed so far has been very academic, without much practical application. Psychologists, it seems, spend their time on the learning of animals or, with human subjects, giving thought to a memory for nonsense syllables instead of something useful like calculus or biochemistry or the Cardinals' batting averages. The reason of course is that theory will eventually pay off with practical values; and in the meantime, psychologists have *also* done work on the practical aspects of human learning. A prime example concerns study method.

At the first of this chapter it was observed that the student's problem is not merely to learn but to learn *and remember*, long enough to pass examinations. He may even want to remember longer than that. It is easy to read a paragraph in a textbook and—for the moment—know what's in it; but then comes retroactive interference, due to learning the next paragraph and the one after that. The net result is that having read through a whole chapter you may find you can recall the last page or so only. How is this to be avoided—how is the learning to be retained?

Good study method provides an answer. What is more, it provides an answer for the student's other main problem: how to get himself to do the studying, at least to the extent that it makes study less unpleasant—even enjoyable at times.*

Almost any student can benefit from a book on study methods. The sad thing is that the one who needs it least will benefit most; for others, with bad habits, find it hard to change. A typical example: the student gets the book and means to use it, but using a book effectively is just what he does not know how to do and he complains that he has not time to devote to this one now—though if he did he would save the time ten times over. Nonetheless, this must be said: *If you have trouble with getting down to study, find it hard to concentrate or cannot recall what you have read, get a book on study methods and use it.* Study it; it will repay the time invested. The following brief survey, all that can be offered here, is made with the hope that it will induce the student to go further.

A good study method makes study easier and more tolerable as well as more efficient. Bad study method is inefficient and makes the task unpleasant and hard to face. Many students, including some very intelligent ones, do not realize that there is more than one way of attacking a chapter of history (for example). They sit down to read the chapter through, trying to retain detail at the same time—almost to memorize. No technical book is meant to be read that way, still less to be memorized. Retroactive interference has full opportunity to take effect and the concentration on detail keeps the student from attending to the large picture, the tenor of the chapter as a whole. His attention wanders, he realizes that he is not concentrating as he meant to, he knits his brow, stares harder at the page, resolves to stop thinking about other things, and tries again to read and remember. It is an impossible task with technical material of more than a few paragraphs. Attempting it is unpleasant as well as inefficient.

No good student goes at the task in such a way. One who knows how to study does *not* begin by reading the chapter, but sets out to see first what it is about: by reading the summary if there is one, looking at the headings, sampling and skimming and relating what he finds in this way to what he thinks the author's views are—all with the intention of knowing what the chapter says and what its general meaning is before ever reading it. This allows a minimal opportunity for retroactive interference. Instead of learning series of details, meaningless in themselves until related to the main theme, the details when eventually the student gets to them are fitted into and become part of a single larger picture. No interference is involved. The larger picture is what is remembered, not the details, though in fact it also has the effect of making detail easy to recall. Also, no heavy effort at concentrating is called for, either in the preliminary scanning of the chapter or in the later mastery in detail.

*A strong statement.

A further step toward the avoidance of that strain of concentration made necessary by bad study habits comes with the extensive use of note-taking. Merely making a note on a difficult passage is an effective mechanism of attending to it; and if there is something that you particularly want to fix in memory, make a note—write it out on a separate piece of paper, even if you throw the paper away afterward. *Do not underline* as a means of recall; write it out. The student's aim should be that of a lazy man, at getting the most for the least work: but a lazy man with intelligence, and the underlining method is not intelligent. Take the trouble to make notes. It more than repays the extra time and effort.

Your notes should not merely summarize. You should be asking questions, commenting and criticizing, looking for evidence to support ideas of your own, and in general taking an active attitude toward your task instead of passive retention of what you read. It is not true that we learn only by doing—as we have seen, latent learning is an outstanding characteristic of the human species—but even latent learning is supported and maintained by a critical and active mental attitude.

For the student with good study habits, study is not the nightmare it sometimes is for others but may almost be fun. If it is a nightmare for you, or if you have difficulty in persuading yourself to get down to work, or if you have trouble recalling what you have studied or trouble getting it down on paper in the examination, consider: it may not be your intelligence but your study method that is at fault. Get hold of a good book and use it. What has been said here is only a beginning.

SUMMARY

Before he goes farther, the student might use this chapter as material for *a practical exercise in study method.* It is suggested that he first look through the chapter and make a list of the headings; under each heading, make a list of the technical terms found in that section of the book (mainly the italicized terms, but he should look also for technical terms he is already familiar with); and then make a list of the principal problems that are discussed. Then he might prepare a summary, and a brief study guide as he would make it for another student, along the lines of the suggestions for review in the previous Chapter Summaries of the present text. When he has got through doing this, organizing the chapter for someone else to study, he may be surprised to find that he does not need much more study himself—all that remains, for mastery of the material, may be to fill in the chinks.

Now for a summary, which the student may compare with his own: If learning is to last, a period of consolidation is necessary. We do not know what happens in this period, but this may be where primary reinforcement has its effect. The need of consolidation is shown by the disturbing effects of shock following learning. The hippocampus appears to be essential for consolidation of human learning, less necessary with lower mammals (but this may be because the human learning studied was cognitive, without primary reinforcement, whereas the animal experiments used primary reinforcement).

Normal forgetting seems mainly due to retroactive interference, a disturbing effect of later learning on the retention of earlier learning, but there is proactive interference as well and some evidence of an effect also of disuse. We speak of "forgetting" when no active steps are taken to change the response. When one deliberately sets out to suppress a habit, this is called "extinction," and takes two forms: a temporary extinction with massed trials, due to inhibition, and a lasting extinction with spaced trials (probably a form of new learning that prevents the old learning from having its behavorial effect).

Distortions of memory are of great practical importance, as for example in legal testimony. They may occur because some items in a complex memory have dropped out, but also thought processes (recalling and thinking about the events in question) may have the effect of rearranging and adding to the retained items ("it must have happened that way").

The theory of learning does not add much to the practical advice one can give the student, but empirically we know a good deal. Any student, whether he is doing well or badly, should make himself really familiar with a good book on how to study.

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