Psy1012/Psypro4112- høst 2020

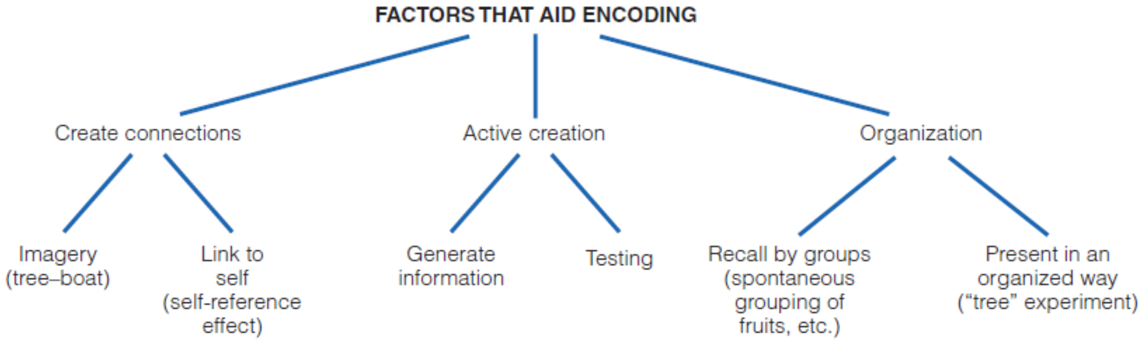
Besvar to av de tre følgende oppgavene:

Answer <u>two of the following three</u> questions:

1. Hva kan du gjøre for å kode informasjon bedre, og hvordan fungerer dette?

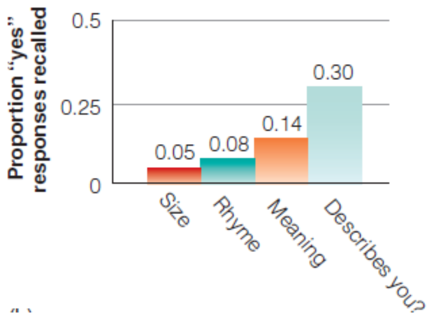
What can you do to encode information better, and how does this work?

Sensorveiledning: Factors that aid encoding are summarised in this figure.

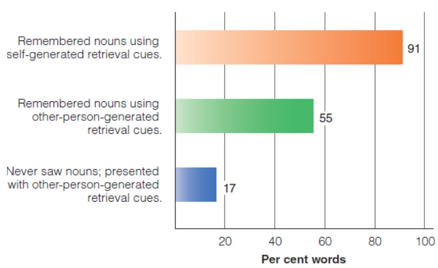


Imagery creates more possible routes to retrieval. The term imagery does not have to refer to visual images alone; associating places or movements with the to-be-encoded information is also an option. All this also makes the information that is being encoded more distinctive, and so less likely to be mixed up with other information later.

A link to self is likely to involve some emotion, and emotion functions as a marker that the information being encoded matters.



Self-generated retrieval cues are more effective than those generated by others. The book doesn't say why. Two plausible reasons are that self-generated cues can be more easily linked to what is emotionally relevant to that individual, and also that they may organise information in a way that makes sense to this individual.



Among the circumstances of testing are context dependence (do encoding and retrieval context match, regardless of the content of memory?) and mood congruence (does the content of the memory match the mood at the time of retrieval?). Both effects act trough similarity between retrieval cues and some aspect of the information to be retrieved, either associated contextual information or the emotional valence of that information.

Further testing itself enhances later retrieval success. People who encode by testing themselves (retrieval practice) perform better than those who spend the same amount of time just studying some more.

Information is easier to retrieve if it is organised, either spontaneously at the time of retrieval, if testing instruction allow that, or at the time of encoding. An example of organisation at the time of retrieval would be to recall items by category. Examples of organisation at the time of encoding would be applying a hierarchy of categories ("these are minerals, which divide into stones and metals; stones are either precious or masonry; metals are either rare, common, or alloys"), or ordering them in a table.

The general principles are that information will be easier to retrieve if

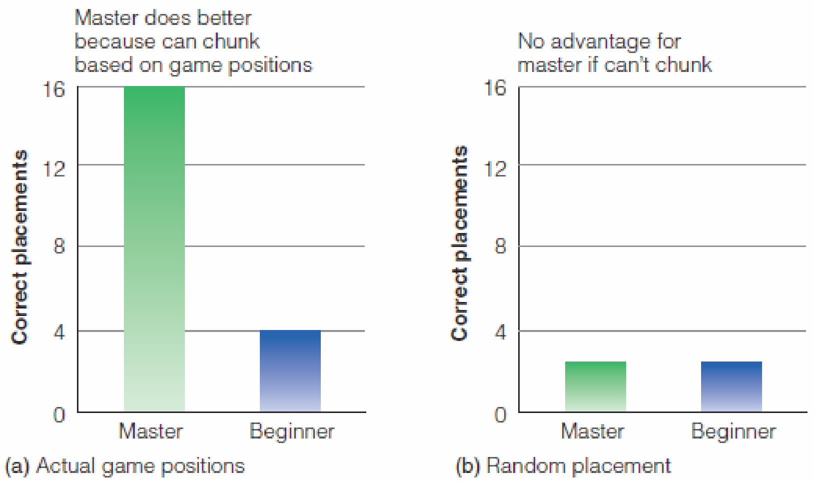
1. Information feels important at the time of encoding.
2. Target memory and retrieval cue are as similar as possible.
3. The target memory differs as much as possible from other memories
4. There are multiple and well practised retrieval routes.

2. Hva forteller sammenligningen av mester- og nybegynner-sjakkspillere (Figur 12.18) og fysikkprofessorer og studenter (Figur 12.19) om problemløsning generelt og ekspertise spesielt?

What does the comparison of master and beginner chess players (Figure 12.18) and of physics professors and students (Figure 12.19) tell you about problem solving in general and expertise in particular?

FIGURE 12.18
Results of Chase and Simon's (1973a, 1973b) chess memory experiment. (a) The chess master is better at reproducing actual game positions. (b) The master's performance drops to the level of the beginner's when the pieces are arranged randomly.

Based on: Chase, W. G. and Simon, H. A. (1973b). Perception in chess, *Cognitive Psychology, 4,* 55–81.



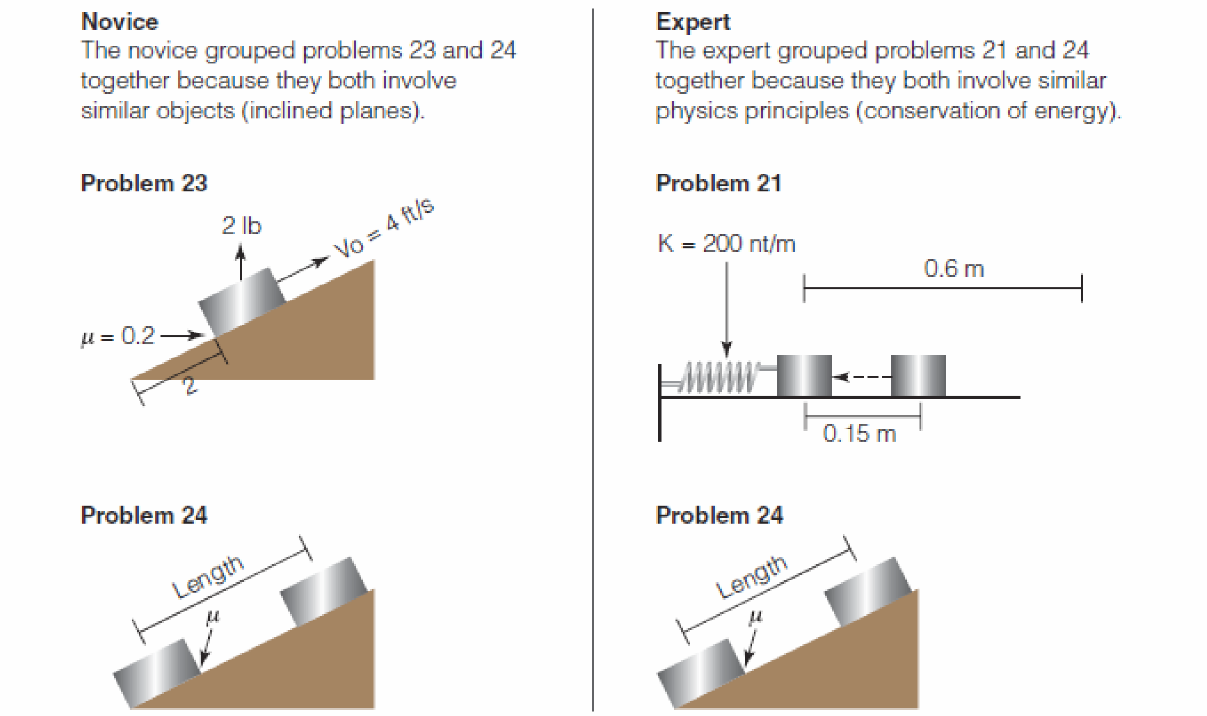


FIGURE 12.19
The kinds of physics problems that were grouped together by novices (left) and experts (right).

Based on: Chi, M. T. H., Feltovich, P. J. and Glaser, R. (1981). Categorization and representation of physics problems by experts and novices, *Cognitive Science*, *5*, 121–15. Reprinted by permission of Taylor & Francis Group.

Sensorveiledning: Expert chess players do not differ from less expert players in short-term memory capacity when remembering random arrangements of chess pieces. However, when remembering positions from real games, the more expert players remember larger chunks, indicating that they recognize familiar patterns. The quality of expert players' looking ahead in a game is not much affected by time constraint, again indicating reliance more on pattern matching than brute force calculation. Expertise depends more on having a lot of well-organised information in memory rather than exceptional processing power. Therefore it should depend a lot on practice. If that applies to reasoning domains that people can choose or avoid according to their preferences, it is likely that it also applies to domains that cannot be easily avoided, say social reasoning. There, practice should differ less, and so its effects would be less apparent in individual differences. Nevertheless, it is reasonable to infer that reasoning in general depends a lot on pattern matching and information in long-term memory.

Long-term memory stores information in a meaning-based as well as a visual code. The meaning-based code allows efficient retrieval of relevant information. It is not necessary to search through the content of memory until something is found that is judged relevant while reviewing. Further, long-term memory is good at pattern matching. Efficient retrieval of relevant information combined with limited capacity for information processing should bias people towards reasoning based on past experience and pattern matching.

Experts typically can chunk together several steps of a problem-solving procedure, and so reduce their working memory load when solving a problem in their areas of expertise. Therefore expertise can even be associated with a reduced cognitive load.

The example of the physics students and professors also shows a transition from classifying problems based on their surface characteristics to classifying them based on more abstract criteria, at least in a domain where that abstraction helps. Such similarity judgements should be expected to guide reasoning by analogy. That transition resolves an apparent contradiction in the study of problem solving (a link not explicitly made in the book, so a student who understands this is doing well): in the laboratory, people are typically not good at using analogies when offered logically equivalent problems with different superficial detail. In real life, people use analogy a lot. But for reasons of experimental control, laboratory problems are designed to be unfamiliar, so that everyone starts off the same. That lack of familiarity makes it more difficult to abstract the meaningful logical structure that makes analogies useful in problem solving.

If reasoning depends a lot on experience and information in long-term memory, that suggests that expertise is specific to the domain of experience. It may transfer to the extent that reasoning in another domain relies on the same logical relationships and the expert has enough experience in the new domain to notice the analogies. Expertise is unlikely to transfer to a domain in which different logical relationships are relevant.

In summary, the two figures indicate that reasoning depends heavily on information in long-term memory and on pattern matching, rather than brute force calculation, that familiarity helps with finding underlying logical structures that make analogical reasoning useful, and that expertise is likely to be domain specific and does not easily transfer.

3. Beskriv de forskjellige langtidsminnesystemene og hva de gjør. For hver av dem, forklar hva konsekvensene ville være hvis noen rett og slett ikke hadde dette minnesystemet. Merk at bare noen av disse teoretisk mulige spesifikke minneforstyrrelsene faktisk er blitt observert. For de som ikke ser ut til å eksistere i naturen, må du utlede hvordan de vil være.

Du er velkommen til å hente inn informasjon utenfor pensumet, men da vil det hjelpe hvis du nevner kilden, slik at vi kan kontrollere at du har fått det riktig. Dessuten er det greit hvis du trekker en konklusjon som er rimelig ut fra det du kan forventes å vite, men som er i konflikt med mer spesialkunnskap. Dette spørsmålet handler like mye om hvordan du tenker som hva du vet.

Describe the various long-term memory systems and what they do. For each of them, explain what the consequences would be if someone simply did not have this memory system. Note that only some of these theoretically possible specific memory impairments have actually been observed. For those that do not seem to exist in nature, you will have to infer what they would be like.

You are welcome to bring in any information from outside the pensum, but then it would help if you mentioned the source, so that we can check you got it right. Also, it is fine if you make an inference that is reasonable based on what you can be expected to know, but that conflicts with more specialist knowledge. This question is as much about how you think as what you know.

Sensorveiledning: Figure 6.1. shows the taxonomy of long-term memory systems presented in the book (it is simplified, and students who have read more widely may present finer distinctions):

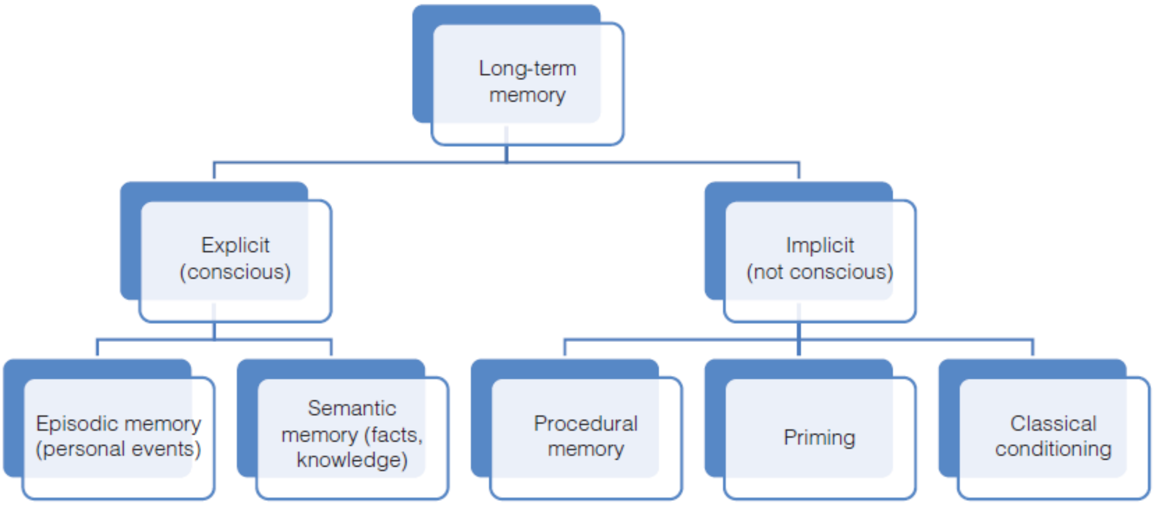


FIGURE 6.1
Long-term memory can be divided into explicit memory and implicit memory. We can also distinguish between two types of explicit memory: episodic and semantic. There are a number of different types of implicit memory. Three of the main types are procedural memory, priming and conditioning.

Episodic memory stores the experience of specific events. The book only discusses its role in mental time travel into the past, reliving (with individually varying fidelity) past experiences. A student who mentions the role of episodic memory in mental time travel into the future, that is, imagining possible futures for the purpose of planning, is going beyond the pensum. In terms of the function, this is important, though, as the major advantage provided by episodic memory is that it provides past experiences as building blocks for constructing possible futures. Episodic memory is impaired in amnesia. Retrograde amnesia is the loss of information encoded before brain injury, anterograde amnesia an impairment in the ability to encode new memories. Retrograde amnesia is typically graded, primarily affecting memories stored up to a few years before injury.

Semantic memory stores factual knowledge without tracking when it was first acquired. Consistent patterns may be extracted from multiple experiences, and then stored as semantic memory. Semantic memory may be impaired in amnesia. The various agnosias are more specific impairments of semantic memory. They can be domain specific (people no longer recognise a category of objects) or modality specific (for example, people fail to recognise objects by sight, but can recognize them by touch).

The various implicit or non-declarative memories are preserved in amnesia, but apart from that, they are quite different from each other, have different neural substrates, and different functions. The book does not discuss specific impairments in any of the non-declarattve memory systems, and I am not aware of any being reported in the literature. The discussion of hypothetical impairments is therefore a thought experiment intended to make students think about the functions of these systems.

Procedural memory is knowing how to do things. This includes perceptual skills, motor skills, and sequences of actions that have become automatic through practice. A lack of procedural memory would therefore force someone to act like a beginner all the time, having to plan everything instead of being able to go on autopilot and act by habit. This would place high demands on attention.

Priming prepares information for retrieval that is related to what has recently been perceived. Without priming, either relevant information would be less likely to be retrieved, or else a more active search would be needed.

Classical conditioning links events in the outside world with each other and with the relevant emotion. It creates expectations, and this learning may express itself as intuition and gut feeling. By linking emotion to previously neutral stimuli, it can direct attention to stimuli that predict emotionally relevant events.