PSY1012/PSYPRO4112

Svar på to av de tre følgende spørsmålene

Hvor nøyaktig kan du forvente at hukommelse for en hendelse skal være? Hvilke prosesser påvirker nøyaktigheten?

Hvilke aspekter ved persepsjon og hukommelse er relevante for problemløsning, og hvordan?

Hvordan er emosjoner relevant for kognisjon?

How accurate can you expect your memory of an event to be? What processes influence accuracy?

What aspects of perception and memory are relevant to problem solving, and how?

How are emotions relevant to cognition?

SENSURVEILEDNING

Emnekode og navn: PSY1012	**Semester / År / Eksamenstype:** Semester/ Skriftlig eksamen, x timer

Oppgave:

Eksamen

Relevant pensumlitteratur:

Goldstein & van Hooff (2020). Cognitive Psychology

Eksamenskrav:

Answer any two of the following three questions.

How accurate can you expect your memory of an event to be? What processes influence accuracy? Hvor nøyaktig kan du forvente at hukommelse for en hendelse skal være? Hvilke prosesser påvirker nøyaktigheten?

Goldstein and van Hooff organise that chapter into the following subsections:

1) Source monitoring and source monitoring errors
2) How real-world knowledge affects memory (schemas and scripts)
3) False recall and recognition
4) Memory modification by suggestion
5) Eyewitness memory

Alternatively, a student may choose to organise an answer by underlying mechanism. Because experimental paradigms often do not engage just one mechanism, and may not be designed to identify the mechanism, illustrative results may have to be chosen based on a reasonable inference regarding the mechanism. Then relevant mechanisms are:

1) Effects on retrievability, which, in this book, only means priming, because retrieval-induced inhibition is not in the pensum
2) Source inference based on familiarity
3) Creation of alternative memories
4) Modification of existing memories through reconsolidation

These mechanisms are described in connection with an answer based on how Goldstein and van Hooff present the topic, and will not be presented separately.

A response based on Goldstein and van Hooff's chapter may start with Bartlett's War of the Ghosts as an example of memory being constructed, then go into source monitoring. An example given there is cryptomnesia, believing something is one's own idea after having forgotten the original source. Another is the false fame effect. If people are given a list of names, and the next day they are asked to identify minor celebrities from another ,ist that

contains some of the names from the first list, the familiarity of names from the first list may be misattributed to fame. If there is no memory of the source, and names on a list may not be interesting enough to be retained as an episodic memory, complete with the context in which the name was encountered, and if people are asked who is slightly famous, it is reasonable to attribute familiarity to fame. Goldstein and van Hooff then refer to later sections, where they will take the idea of source confusion up again in connection with suggestions and eyewitness memory.

The influence of real-world knowledge is explained by reference to schemas and scripts. For example, when participants were asked to wait in a professor's office, and then the test was to list what they had seen in that office, 30% reported seeing books even though there were none. They could have used a schema of a professor's office to infer that books must have been present. Goldstein and van Hooff do not distinguish inferences made at the time of encoding from inferences at the time of retrieval. A student who wishes to discuss that could reasonably argue that participants are unlikely to have inferred the presence of books they could not see while in the professor's office, it seems more plausible that this happened at the time of retrieval. However, participants may also infer, at the time of encoding, the occurrence of an event that is implied but not explicitly reported, as in the story of a dentist's visit.

Next, there is the Deese-Roediger-McDermott or DRM paradigm, in which a list is constructed from the 15 most common associates of a core word that is not included in the list. Each list item conceptually primes the core word (called automatic activation in the book). That makes the core word more retrievable, and feel more familiar, leading to a high rate of false recognition and false recall whenever source monitoring fails.

When other people supply information that conflicts with the original event, that is suggestion. And example is Loftus and Palmer's misinformation experiment, in which participants watched a video of two cars colliding. Those who were asked how fast the cars were going when they *hit* each other reported an average speed of 34 miles per hour. Those who were asked how fast the cars were going when the cars *smashed into* each other reported an average speed of 41 miles per hour, and were more likely to report the presence of galss on the road, even though there had been none in the video. The book then offers two explanations.

One is retroactive interference, which is interpreted very specifically as the original memory being replaced by the new. The book does not cross-reference reconsolidation, which provides a mechanism for doing just that. The results of Hupbach et al. can be described as reconsolidation replacing the original source memory by new information. A student who notices that goes beyond what is explicitly written down.

The book instead presents another interpretation of the misinformation effect, that misinformation creates a new, parallel memory that competes for retrieval. I do not think the example given in the book is very persuasive as presented, so students may also have some difficulty. Participants saw slides of a man stealing a computer, with a woman narrating. Then one group shortly after heard a misleading story told by the same woman. Another group heard the misleading story two days later, shortly before retrieval, told by a man. The group that heard the story early and from the same narrator relied more on the misleading narrative. Students may choose the example given in the lecture, a study by Bekerian and Bowers that reproduced an experiment by Loftus, then showed that when better retrieval cues were provided, participants were more likely to remember the original event, showing it could not have been replaced in this case. Instead, there must have been parallel, conflicting memories.

Misinformation from other people may be used not only to alter or distract from a memory of an original event, but instead to construct a memory of an event that never happened at all.

This is often done by presenting participants with ficticious reports of childhood events that either their caregivers said never happened, or that could not have happened, such as meeting Bugs Bunny, a Warner Brothers character, at Disney World. Real world applications are therapists creating false memories of childhood events, such as abuse, or police inducing false confessions that the accused actually believes.

Familiarity, source confusion, and suggestion can affect eyewitness memory. Ross et al. showed an experimental group a video of a male teacher reading to students. A control group saw a video of a female teacher. Then all saw a video of the female teacher being robbed. Participants in the experimental group were more likely to identify the familiar male teacher as the robber, even more so if the actual robber was not in the photo spread. That may be explained by lack of source information making people rely on familiarity instead. Without the actual robber, his familiar face cannot compete with the familiar face of the male teacher.

Misinformation may be supplied to eyewitnesses by other, including police officers. Apart from the distortion of the content of the memory, there may also be distortion of the witness' confidence, such that a witness who was very uncertain at the time of identification falsely remembers great confidence by the time of the trial. A post-identification feedback effect was induced by an experimenter confirming the participant's choice was correct.

Recommendations for improving lineup pocedures are:

1) When asking a witness to pick the perpetrator from a lineup, inform the witness that the perpetrator may not be present. If they assume the perpetrator is present, and that is not true, a false identification is guaranteed.
2) The people in the lineup who are not suspects should be similar to the suspect. That reduces false positives.
3) Present people sequentially, rather than simultaneously. A simultaneous presentation makes it more likely that the witness picks the best fit, even if that best fit is not all that good.
4) The person guiding the witness through the procedure should not know who the suspect is, to avoid giving the witness any unintentional cues.

Goldstein and van Hooff briefly mention Schacter's seven sins of memory article. An answer based on that should contain this information:

1. Transience. Memory fades. Depending on how much time is available to answer the questions, students may elaborate on this to list phenomena involved forgetting, such as proactive interference, retroactive interference or decay.
2. Absent-mindedness. This is lack of attention. What I consider most relevant here are divided attention as an example of limited attentional capacity, selective attention, as an example of excluding information considered irrelevant at the time, and concrete examples such as change blindness. Topics such as filter bottleneck and attentional resource models I consider less relevant, unless they are used to explain selective or divided attention.
3. Blocking, as in the tip of the tongue phenomenon. The best explanation for that is a mechanism not discussed by Goldstein and van Hooff, namely retrieval-induced inhibition.
4. Misattribution. Information from one event is misattributed to another, or an inference is misattributed to a story or an experience. For example, people told that "Little

Johnny's mother looked out of the kitchen window to see why he was making so much noise. She saw that he was banging a nail into the bird house he was building." People are later asked what tool the story said little Johnny had been using. Many report a hammer, even though the story did not mention the tool; a hammer is merely a plausible inference, that may have been inserted into a mental image that people constructed. Other examples come from Loftus' research, where often information contained in a question is falsely attributed to the original event the question asks about.

5. Suggestibility. This is misattribution where the false information specifically comes from someone else's suggestion. Therefore Loftus' research also fits this category.
6. Bias. This is a quantitative distortion of memory. Loftus and Palmer's study asking participants how fast cars were going when they either hit or smashed into each other would fit.
7. Persistence. Some memories are far more accessible than people would like, such as in post-traumatic stress disorder. However, the phrasing of the exam question makes persistence irrelevant, so we can't expect anything on this, either.

What aspects of perception and memory are relevant to problem solving, and how? Hvilke aspekter ved persepsjon og hukommelse er relevante for problemløsning, og hvordan?

Relevant aspects of memory are:

1) Limited working memory capacity
2) Categorisation
3) Priming
4) Not explicitly discussed by Goldstein and van Hooff: humans are very good at retrieving semantically relevant knowledge from long term memory

Relevant aspects of perception are exploiting

1) Physical regularities
2) Semantic regularities

When there are well defined initial states, goal states, and transition rules, problem solving can be described as search through a branching set of possible states, a search tree. Examples would be playing chess, or the Tower of Hanoi problem. Limited working memory capacity makes it difficult to exhaustively search through even a fairly limited number of states, as found in noughts and crosses (tic-tac-toe) or the Tower of Hanoi. It becomes impossible when there are many millions of possible states, as in chess, or go, or anything resembling a travelling salesman problem. Then it becomes necessary to simplify the search problem.

One way of achieving that is through means-end analysis, creating subgoals that are more similar to the goal state than the initial state, but still close enough to the initial state that the

search tree to the subgoal becomes small enough to be manageable. Neither the chapter on perception nor that on categorisation discuss similarity judgements or feature spaces, so students are not required to pursue that line of thought.

Another way of simplifying the search problem is only hinted at in the book, namely grouping functionally equivalent states together in a category. The book points out that expert chess players can reconstruct board positions from real games better than non-experts by matching them to patterns stored in long term memory. It does not explain that a pattern would not be a unique board position but a set of positions grouped together into a category defined by commonalities in what is a good move and why, that is, by semantic regularities.

The distinction between physical and semantic regularities does show up in the comparison between how physics students and physics professors categorised problems in the study of Chi et al (1981). The students grouped together problems that had similar perceptual elements, such as inclined planes. That is categorisation exploiting physical regularities. The professors grouped together problems with solutions that involved the same physics principles, such as conservation of energy. The professors used semantic regularities. This would help the professors to discover relevant analogies. Analogies are useful to the extent that they exploit similar cause-effect relationships, and these may have little relationship to most of the perceptual features.

Goldstein and van Hooff address that point more explicitly in their discussion of analogical problem solving in the Duncker radiation problem. Radiotherapy to destroy tumours must solve the problem that X-rays don't distinguish between healthy cells and cancerous cells. By directing multiple sources converge on the tumour from different directions, radiation level in surrounding tissue can be kept sublethal, reaching lethal levels only at the focus. One study offered an incandescent lightbulb with a broken filament that is to be welded with lasers as a source of analogy. People found it easier to discover that analogy when the problem was framed as using multiple weak lasers to avoid damaging the bulb, rather than using multiple weak lasers to achieve a high enough temperature to weld. Avoiding damage to the bulb is a constraint that is functionally equivalent to avoiding damage to healthy tissue. When the problem is framed as reaching a high enough temperature to weld, the constraint is that no single laser is strong enough. Although the solution is the same, the analogy is easier to find if the constraints are functionally equivalent. The functional or semantic similarity is what matters to discovering the analogy.

Finally, priming is relevant to functional fixedness and mental set. If people are reminded of the usual function of objects, such as a brush transferring paint, they have a harder time thinking of other features of the object that may be relevant, such as momentum in the two string problem. Priming makes the normal function more retrievable and distracts from other functions. Likewise, repeated success with one solution strategy in the Luchins water jars task repeatedly primes people to think of that solution, and makes it harder to discover other solutions.

People's limited processing power due to working memory constraints, and good ability to retrieve relevant memory through pattern matching, i.e. categorisation, often by semantic regularity, should bias them to rely on memory whenever they can. That suggests that mental set as well as a tendency to accept reasonable conclusions without quibble and checking only when something unexpected occurs (Evans et al., 1983, Figure 13.3 in the book) on average offer a good speed-accuracy trade-off instead of showing humans to be poor reasoners.

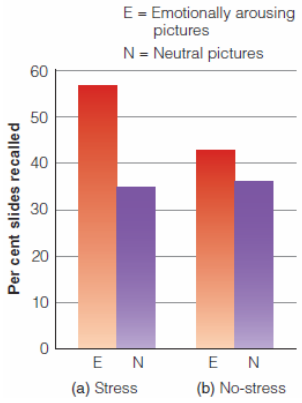
How are emotions relevant to cognition? Hvordan er emosjoner relevant for kognisjon?

First, if students bring in what they learned about the functions of emotions in personality psychology, that emotions serve to identify important information and to motivate action, that is a good thing and should help them structure the answer.

Second, Goldstein and van Hooff discuss the influence of emotion in six contexts, which are attention, the effect of stress on working memory, the reminiscence bump (indirectly), encoding of memory, decision making, and the effect of mood on creativity. Students should discuss at least two, and can make up for not mentioning some points by discussing others in greater depth. Discussing other situations in which emotions are relevant to cognition is also welcome.

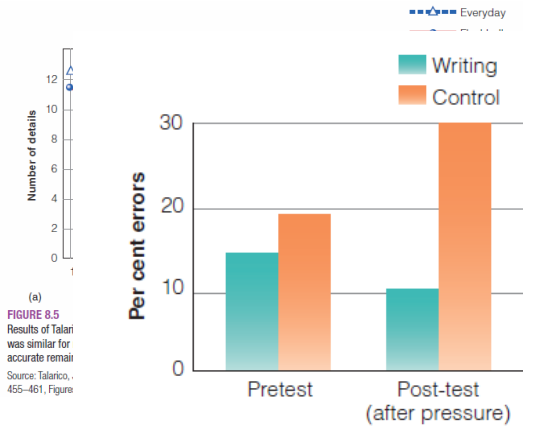
Attention: Goldstein and van Hooff lead with two results that do not always replicate. One is that fear relevant images are found faster than neutral images, independent of the number of distracters. The other is that emotionally relevant words lead to longer response times in a Stroop test. The result they consider robust is that in dot probe task, response times are shorter on the side on which a threatening stimulus had been shown. Threatening items bias attention. Goldstein and van Hooff say it is not clear whether the difference in response times comes from attention being drawn to the place where the threatening image was, which would imply faster responses there, or whether responses to the side without threat are slower because it is hard to disengage from the threat. Goldstein and van Hoof do not mention studies using items that elicit positive emotions.

Goldstein and van Hoof do not explicitly link the reminiscence bump to emotion, yet one of the proposed explanations is the self-image hypothesis, and self-image can hardly be unemotional. The self-image hypothesis proposes that the enhanced retrieval of autobiographical memories from adolescence and young adulthood occurs because these are the periods when most people's self-images are being formed. Those who emigrate when they are older are an exception, and do show a second reminiscence bump from around that time. However, that finding is also consistent with the cognitive hypothesis, which proposes that periods of rapid change followed by stability enhance encoding. Thus the reminiscence bump is a possible example of emotion influencing memory, not a definite example.



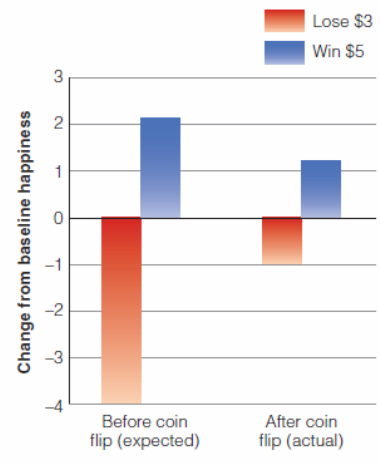
If emotions mark the kind of information that, on average during evolutionary history, has been important, that makes sense of the finding that emotional material is remembered better (Figure 8.3, LaBar et al, 1998). That emotional modulation seems to depend on the amygdala, seeing that a patient with amygdala damage failed to show it. Further, the enhanced encoding appears to be specific to emotionally relevant material. When Cahill et al. (2003) showed neutral and emotionally arousing material, and then those participants who put an arm in cold water, causing stress and the release of cortisol, specifically remembered the emotional material better than controls, while there was no difference for the neutral material. Given that the manipulation occurred at encoding, this could be seen as mood-congruent encoding, though Goldstein and van Hooff don't use that term.

That stress specifically enhances encoding of emotional material is consistent with intense emotion resulting in later retrieval of the most emotionally arousing elements of an event (Goldstein and van Hooff mention weapons focus), but that the impression of remembering contextual details very clearly is an illusion. People *believe* that they remember more details, hence the name flashbulb memory, but by 42 days after the event, they remember less details when compared to an everyday memory (Figure 8.5, Talarico et al., 2003).

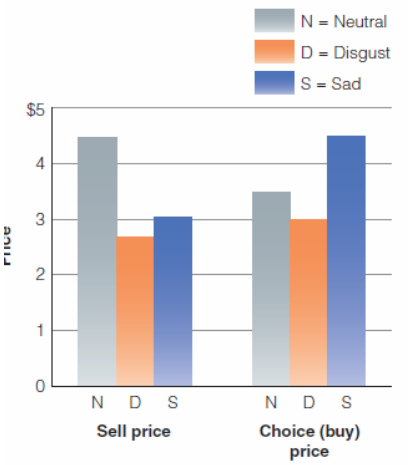


The effects of worrying on performance in a working memory task resemble those of a second task: both take up some working memory capacity. Consequently, putting pressure on people is likely to decrease their performance in cognitively demanding tasks. It also follows that relieving pressure should lead to recovery. Ramirez and Beilock pretested their participants, then gave them instructions designed to put them under pressure. Then the expressive writing group wrote their thoughts and feelings about the test they were about to perform, which was intended to relieve pressure. The control group wrote about something unrelated. The control group increased its error rate in the post-test, while the expressive writing group decreased its error rate. There is again opportunity to link up with knowledge beyond this course, and although that is not a requirement, it is a bonus if a student does that. For example, persistent worrying caused by poverty can reduce measured IQ scores, which would explain at least some of the correlation between IQ and income. Therefore higher IQ generating more income is not the only explanation for that correlation.

Emotions affect decision making in several ways. First, emotions provide preferences. An ability to predict the consequences of choices is of little use if someone does not prefer some outcomes over others. Accordingly, people with flattened emotions are often impaired in their decision making. Further, any errors in predicting the emotions elicited by possible outcomes would distort the choices people make. The finding that people are more concerned about negative outcomes than about positive outcomes of the same magnitude can be explained by people systematically overestimating the impact of negative outcomes (Figure 13.14, Kermer et al.).



Incidental emotions may affect decisions. Optimistic people tend to ignore negative information and focus on the positive, while anxious people are likely to avoid choices that have some chance of large negative consequences. Some students may realise that this must be closely related to the availability heuristic. Probability judgements based on what examples are available for retrieval from memory must be biased by whatever biases memory, and that would include mood congruent memory. However, the book does not make that connection explicit.



Instead, the book examines more specific emotions. In a neutral mood, the buying price for an item is less than the selling price. If people are disgusted, increasing the motivation to withdraw, especially selling price decreases. If people are sad, increasing the motivation for some change, selling price decreases, but buying price increases. A follow-up study lent further support to the *myopic misery* hypothesis that sadness brings a motivation for some immediate change, finding in a temporal discounting study that sadness increased impatience/impulsivity, while disgust had no effect.

All Goldstein and van Hooff say about creativity is that positive and cheerful mood states are activating and associated with an approach motivation enhance creativity. Moods that are associated with avoidance motivation, which encompasses both feeling calm and relaxed and negative moods, reduce creativity.

In summary, emotion biases attention, interferes with working memory, biases encoding and retrieval, affects creativity, and affects motivation in decision making. Goldstein and van Hooff present these separately. Any connections that students make across topics are a sign of someone thinking more deeply about the subject, rather than merely reproducing things written in the book.

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