Module: Psychological Foundations of Mental Health

Week 3
Introduction to emotion and emotional processing

Topic 2
Emotion processing: bottom-up effects of emotions on cognitive processes – Part 3 of 3

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Lecture transcript

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Memory is the process by which new information is encoded, consolidated, and subsequently retrieved. There is widespread belief that emotional events are better remembered than non-emotional events. Some really good examples of this comes from patients with profound amnesia.

In one study, Johnson and colleagues presented patients with Korsakoff's syndrome with photographs of male faces. Some faces were described as good guys, while others were described as bad guys. A week later, the same patients were shown these photographs again and asked to make judgments about the person in each photo, whether they seemed nice or not. As these patients have difficulties learning new information, have an inability to remember recent events, and long term memory gaps, they showed no overall recollection of the faces, but nonetheless, their judgments were consistent with the initial descriptions. It is clear that emotions can impact on the outputs of the system.

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Another clear illustration of this is through flashbulb memories, which refer to memories that are laid down in great detail to salient events. These don't just have to be personally salient events. But in fact, many studies of flashbulb memories are conducted during big events in the news, for example the assassination of President Kennedy, the death of Princess Diana, the September 11th attacks. When asked about such stories, most people can usually describe exactly where they were, what they were doing, who they were with, et cetera, with great clarity and say that their memories are vivid.

But how accurate are these memories? Are they a valid depiction of reality? The data would suggest that these memories are certainly confidently reported on, but that the memories are not always accurate. Such designs usually involve interviewing people immediately after an event and again three years later with some discrepancies in information between the two assessment points.

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It seems that in the case of big news stories, some of the memories are not as accurate as first thought. This may be because they are more subject to wider scale post-event analysis, for example, reading commentaries by other people, talking to others, et cetera. What about in the case of more controlled lab experiments?

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Scientists have examined this question by giving people emotional and non-emotional stimuli, either words or pictures, during an initial encoding phase. At a later retrieval phase, participants are asked whether the picture is old or new, and if it is an old picture, whether they know or remember it. 'Know' refers to whether the stimulus is familiar even though the specific contextual details are forgotten, while 'remember' refers to being able to bring to mind the event and the various contextual details.

Using this paradigm, Kevin Ochsner in 2000 showed that negative pictures were remembered more accurately relative to positive or neutral pictures and that more arousing pictures, both positive and negative, were remembered more accurately. Moreover, of the correctly identified old negative pictures, participants were more likely to endorse 'remember' judgements and not so much 'know' judgments. Thus, negative pictures appeared to be remembered more accurately with rich detail.

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But what are the mechanisms by which emotions affect memories? Animal experiments show that stress hormones enhance post-learning consolidation of aversive memories but are also thought to have effects of the more immediate processes during memory formation. One hypothesis is that emotional arousal can narrow attention to hone in on particular aspects of the central event but not those that are peripheral.

This is, in fact, consistent with what we studied in the section on attention when we discussed how emotional situations, those that involved danger and reward, grabbed attention and made it through the selective process for further processing, enabling us to respond appropriately. This effect can have consequences for eyewitness testimony in crime scenes, as one study showed not only that participants spent a greater period of time focusing in on a weapon in a crime scene, but also that the amount of time doing this was inversely correlated with their ability to identify a criminal. As such, it has been termed the weapon focus effect.

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While this narrowing of attention is clearly adaptive, under some forms of extreme stress some individuals respond by presenting with memories that are not specific and, in fact, overgeneral. These memories are termed overgeneral autobiographical memory and characterise individuals with a number of psychiatric conditions that mostly arise after a traumatic or negative life events, such as post traumatic stress disorder, bipolar, or major depression. In fact, differences between individuals with these conditions and healthy controls on overgeneral memory cannot easily be explained by other factors such as education, verbal intelligence, or general episodic memory differences.

Overgeneral memories are those that are vaguely described when asked to think of the memory in response to cue word. So an example of cue word could be "garden," where a specific memory might be, I spent last Friday drinking wine with some friends in the garden because it was a lovely evening, versus a general memory which could be, I have a nice garden. Producing these overgeneral memories could be a structural memory deficit or could reflect a somewhat adaptive strategy for managing extreme emotional distress following aversive events. Specifically, the individual truncates memory searches to avoid recalling unwanted memories. Indeed, some studies that have investigated overgeneral memory in children and young people who have experienced maltreatment in early life, finding that compared to non-abuse or non-neglected comparison participants, they are less specific in their description of autobiographical memories when responding to positive, negative, and neutral cue words.

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While overgeneral memory appears to relate to a deficit in the verbal retrieval of aversive memories, there is some suggestion that memories formed under stress can also present in the form of intrusive involuntary images. Unlike overgeneral memories that are vague, these intrusive

visual images are usually extremely vivid and detailed. Their presence following adversity or trauma can reflect functioning of a second memory system that processes lower level sensory information. Interestingly, these are prominent in a number of mental health conditions, including post traumatic stress disorder, other anxiety disorders, depression, eating disorders, and psychosis, where patients frequently report repeated visual intrusions corresponding to a small number of real or imaginary events. These can be highly distressing and again may be important in maintaining arousal, fears, and other psychopathological features.

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Clearly then, emotional events and stress may be encoded, consolidated, and possibly retrieved in different ways to non-emotional memories. This would also suggest that mood state has an effect on memory processes. In everyday life, this seems plausible. If we are in a bad mood, we are likely to remember more negative things, whereas if we are in a good mood, then happy memories seem easier to bring to mind.

There are two phenomena that have been intensively studied, mood-congruent memory, which refers to our previous suggestion that we remember things that are similar to the mood that we are in, and mood-dependent memory, when the material is more likely to be recalled when in the same mood as when the material was learned. That is, there needs to be a congruence between mood at learning and at retrieval for that to be maximal effects on memory performance. This is an extension of a so-called context-dependent learning, when again material is thought to be recalled best when in the same environment as when it was learned.

I want you to spend a little bit of time now thinking about how these phenomena, mood-congruent memory and mood-dependent memory, can be studied experimentally. To give you a clue, you may need to use some of the techniques learned in the earlier topic to manipulate mood. You can read more about experiments that have demonstrated mood-congruent memory and mood-dependent memory in the reading, but there is fairly robust evidence that mood can influence memory.

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If mood can affect memory, then it follows that individuals with mood disturbances can struggle with memories that are congruent with their mood state. Indeed, a fairly robust finding in major depression is that they show strong explicit recall and recognition of negative material at the expense of positive material. One criticism of this work, however, is that these memory biases could just reflect a response bias where, for example, depressed participants remember both positive and negative words equally well, but that they choose to select the negative word.

To show that this is not the case, implicit memory tests have been used. That is, in these tasks, it is not obvious that the participants are being tested on memory. An example of an implicit memory task is a word completion task. Here, participants are presented with a list of positive, depressive relevant negative, and neutral words during encoding, which they have to rate for self relevance. Then at the memory test phase, they are given a word fragment to complete, where they have to complete these as quickly as possible.

While some of these words are new words, some are from the list that was rated during encoding. Data from these tasks generally showed that depressed participants are quicker at completing the work fragments of negative words seen at encoding. This suggests that even when response biases are reduced, there still appears to be a memory bias. Again, memory biases may play a role in maintaining depression.

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In summary, we have considered how emotions affect attention, learning, and memory, and how some people might be particularly susceptible to these effects. In the next topic we will consider how cognitive processes can in turn affect the emotional experience.

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