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Memory, Language, and the Theory of Mind.

COMMENTARY

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I first heard of Marcel Proust and his masterpiece "In Search of Lost Time" (1) in a literature class during my first year as an undergraduate. It was the last class on Introduction to Literary Studies and the professor told us he had a treat for us, "a fine biscuit". He then asked someone to volunteer to read aloud from a book.

The excerpt he had selected told the story of a man who experienced a sudden extraordinary feeling as he tasted a spoonful of hot tea in which he had soaked a tiny piece of a *madeleine*, a traditional small sponge cake from northeastern France. The character described being filled by an "all-powerful joy", which was certainly connected to the tea and cake, but could not possibly derive from the taste of them alone. It must have reminded him of something. Proust then describes the details of every effort the character makes to recall the memory which caused so much pleasure to arise from an otherwise ordinary moment. Finally he realises it stemmed from a memory of Sunday mornings in which he would visit with his aunt and she would give him a taste of a crumb of madeleine soaked in her tea. He describes how the memory immediately transported him to her room, to an old grey house and from there "*the town, from morning to night and in all weathers, the square where I was sent before luncheon, the streets along which I used to run errands, the country roads we took when it was fine*". The reader cannot help but empathise with Proust's character, since we have all had the experience of being taken by a memory that transports us to a different time and place.

When I remember this moment of my life (the literature class in which I learned about Proust) I feel transported to two locations: First I can see the classroom, the professor, the people sitting around me, and I can hear the girl who volunteered to read. She had a really soft, soothing voice which agreed tremendously with her task. Second, I can see Proust's character sipping tea from a silver spoon, being taken aback by the previously described feeling. I then picture a dimly lit room where an aunt drinks tea in bed, an old grey house, a small European town and country roads.

Proust is an acclaimed novelist whose work outlived his own time. His passages are still read all over the world, over 100 years after his death. Proust certainly knew that a good narrative communicates information in a way that allows the reader or listener to experience an event. A mere mortal Ph.D. student like myself could never hope to convey a story like he did. However in my research I have been able to encounter a thing or two Proust probably did not know.

For instance: when someone speaks about personal past experiences, such as having tea and cake, they are retrieving *autobiographical memories.*

Autobiographical memory is a memory system which holds specific episodes of an individual's life as well as general information about the world and the self. The ability to recall these episodic details is necessary for the representation of an event (and is known as *episodic memory*). Whereas being able to recall general information (a.k.a. *semantic memory*) enhances the self-knowledge and identity of an individual over time (2). In this article I am going to show that optimal recalling and reporting of autobiographical memories (something Proust mastered) requires at least three cognitive skills: memory recall, language production, and Theory of Mind. Some technical explanation will follow.

In the literature on memory deficits, be it dementia or amnesia, the difference between semantic memory and episodic memory often relies on how general a memory is versus how vivid and unique other memories are (3). For example, we know the features of a wedding day: in Western culture it is common for there to be a religious ceremony, a party, a cake, a white dress, etc. If someone is asked to describe what a wedding in general looks like, they will put together bits and pieces of various weddings they have attended or seen in movies. This information is stored in our semantic memory, our general knowledge. On the other hand when a person is asked to describe their own wedding, (presuming they do not present with any memory deficits) they should be able to describe in detail what type of ceremony they had, who attended the ceremony, what they wore, what the decorations looked like, and so on. When a person has a memory deficit their ability to recall detail decreases and the report of their memory becomes more general. Such that the episodic details are more like semantic details. Therefore a very common way to assess memory is by counting how many episodic details a person is able to provide about an event, in comparison to how many semantic details they provide. For example if there are too many semantic details relative to episodic details, it could indicate that the memory is not very vivid (4).

The method described above is an excellent way to assess memory, but the catch is: what happens when a person not only has a memory deficit, but also a language deficit? If a person has difficulty producing a full discourse (as is the case in aphasia and dementia, as both affect language abilities), the number of details they are able to provide may be significantly smaller compared to a healthier individual, and yet, their memory may be unimpaired.

It is tricky to separate language from memory, but scientists have come up with ways to assess non-verbal memory, such as testing a person's ability to recall pictures and shapes. The matter here is of a different kind: discourse production, which is necessary when recalling a full event from the past (such as describing your wedding), requires a different cognitive ability than simply producing words and sentences. One main characteristic of a well-constructed discourse is *coherence*.

Coherence is the quality of a discourse that is understandable, logically organized and follows a theme which keeps various segments interconnected, and for that, there is often the need of semantic details. Consider this example: "I got married at the beach in January, 1975". This may sound weird to a Canadian interlocutor as January

is not beach weather in the Northern hemisphere. This sentence, even though is a perfectly accurate answer and offers all the episodic details necessary to a question such as "when did you get married?" is likely to raise more questions and confusion compared to a response that said "I don't know if you're aware, but I'm from South America, and the seasons are opposite from here, so I got married at a beach in January, 1975", where "I'm from South America" and "the seasons are opposite from here" are considered semantic information.

Now, say you have the memory. You have the language. That should lead to the perfectly coherent discourse which reports a vivid memory, right? Maybe not. The third and last cognitive skill I would like to discuss is the Theory of Mind. Theory of Mind (ToM) is the ability to infer the cognitive and affective mental states of others. It allows individuals to deduce intentions from attitudes (5, 6). It enables individuals to predict, anticipate, and interpret human behaviour. It is essential for regulating social interactions, such as conversations (7). In the example above, if the speaker is mindful of the interlocutor's background (Canadian) and they are mindful that this interlocutor may not be aware of their own background (South-American) or that the season are the opposite in the opposite hemispheres (Winter time in North America is Summer time in South America), then he or she could address in advance the natural confusion that might be generated by the simple response "I got married at the beach in January, 1975".

Memory, language and ToM are considered distinct cognitive skills, but all are necessary for the production of a coherent discourse, and they all interact with each other. Although scientific studies are supposed to "divide and conquer" (i.e. divide the object of their study into smaller component parts in order to better understand the processes underlying bigger mechanisms) it is important to keep in mind that in reality, there is constant overlap of operations, and no human behaviour is "process-pure". Even though we cannot hope all of us will be able to remember and describe details as well as Marcel Proust, it should suffice to know that the skills are all there.

References

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