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3. Memory, Mental Representations & The Representativeness Heuristic

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Video 3 - Memory, Mental Representations & The Representativeness Heuristic - Transcript

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Hi, this is Katia. In this third video on heuristics, we will continue talking about memory, but also introduce the concept of mental representations and explain another type of heuristic called the representativeness heuristic. In the very first video, you played a game, or you came up with examples of different categories. In the second video, we talked about the possibility that some or all of your answers may have relied on the availability heuristic, which involves retrieving a specific memory that is easily accessible.

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We also mentioned that this retrieval does not need to be conscious. Another heuristic process that may explain some or all of your responses relies not on activating specific memories, but instead activating conceptual or categorical knowledge that is easily accessible. Colloquially, when we talk about memory, we usually refer to episodic memory: memory of specific events or information that we have encountered in a specific context.

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The examples on the previous slide are all episodic memories. What pen you used to write earlier, what breakfast you had this morning, the lecture on psychoanalysis you attended, the conversation you had with your sibling about the best tennis player, all memories associated with a specific time and context. Other examples are your high school graduation or that big fight you had with your partner last night.

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In addition to episodic memory, a second kind of long term memory is called semantic memory. Colloquially, we often refer to this as our knowledge. For example, while your memory of your high school graduation is an episodic memory, your knowledge of what high school graduations are like in general is a semantic memory. Semantic memory is not tied to a specific time or context.

 With respect to the prompts

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in our game, the relevant semantic memory would be: what is breakfast like? What are psychologists like? What are athletes like? When we talk about activating semantic memory or

conceptual knowledge. We often refer to this as activating a mental representation. Mental representations are cognitive structures that stand for something out in the world. It could be something physical, like a strawberry or your best friend, or something conceptual like the number eight.

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The most fundamental characteristic of mental representations is that they allow us to think about aspects of the world in their absence. You can think about what your friend looks like even when they're not around. You can remember a conversation you had with them in the past. You can imagine your plans together for the future. Mental representations can be specific to a perceptual modality like visual, auditory, olfactory, but they can also be multimodal, involving multiple perceptual modalities.

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For example, your mental representation of a strawberry may include what it looks like color, shape, size, but also how it smells, how it feels like when you touch it, what it tastes like. We also spend a lot of time thinking about ideas rather than things or people. Mental representations can be abstract as well. This means less tied to sensation and perception altogether, like numbers or arithmetic.

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Freedom. Democracy. Often this is associated with verbal processing. I hope you can appreciate how important and powerful mental representations are. They enable our thoughts and reasoning about everything from what's for breakfast to what's the meaning of happiness. An obvious question is where do mental representations come from? Strawberries. Friends. Numbers. The simple answer is they are learned.

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We have mental representations of both episodic and semantic memories. But let's focus now on the acquisition and nature of semantic or categorical mental representations. All semantic knowledge is acquired the same way through experience, either direct experience with category members, or with increasingly more frequent information we encounter in what we read, hear and see in the media and from those around us.

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This will be true with respect to learning about objects, about social and nonsocial categories, as well as abstract concepts. Strawberries. Numbers. Psychologists. As we live our lives and encounter information about each of these categories, we develop our mental representations. Here is a visualization to make things more tangible. This is a simplified schematic of an artificial neural network, but you can think of it as an abstraction of layers of cognitive processing, starting from an experiential or perceptual level and ending at a conceptual level.

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What a different experiences and types of information are combined into complex cross-modal mental representations. In this example, we're learning two social categories related to professions: computer programmers and athletes. Throughout our experience, we encounter many examples of both categories. Each person has certain features how they look, how they move, how they talk, what they talk about, where they go, what they do, what their friends are like, and so on.

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These features are represented by the dots on that first layer in the figure. These characteristics of individuals tend to combine in various ways, as represented by the dots and the later layers. Of course, many of these characteristics will overlap between the two categories. Computer

programmers and athletes. But there will also be features, as well as combinations of features that are seen more often for individuals in one category and less for individuals in the other category.

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And of course, the other way around. Over time, with experience and information related to these two professions, we acquire a mental representation of each of these categories. We can answer questions about computer programmers and athletes without thinking of any specific individual. This may seem trivial. Of course we can do that, but how can we do that? We use the most typical features or examples of the category, based on our prior experience and information we've encountered.

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Those most typical characteristics or exemplars are called a prototype, or the stereotype of a category.

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This is where the representativeness heuristic comes in. It involves reasoning and making decisions based on categorization, or the degree to which the current situation, person, object, or event matches to one's prototype of a category for that type of situation, person, object, or event. This heuristic relies on the automatic activation of semantic memory. How can this be applied to explain the answers we came up with in our game at the start?

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Given category prompts such as color breakfast, psychologist, athlete, and only a short time frame to provide an example, a likely cognitive process is to access the mental representation for that category and retrieve the most prototypical or stereotypical example. Those are the example that are usually the most accessible, so blue might be the first color that came to mind because blue is the prototypical color.

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Or eggs and toast might be an exemplar for breakfast because based on your knowledge, that's a prototypical breakfast. Freud might be the name of the psychologist that first came to mind, because he represents your stereotype of a psychologist. If you're a Canadian, perhaps you listed Wayne Gretzky as the athlete because he may be the stereotypical athlete in your experience.

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Note that everyone has their own mental representation of different categories and therefore their own prototypes and stereotypes. That said, when people share cultural and personal experience and are exposed to similar information in the media, they tend to develop similar mental representations. This explains why when I played this game with students in my class, I often see a lot of overlap in their responses, especially for people of similar age and background.

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Let's revisit a couple of scenarios we saw before where we applied the availability heuristic, and see how the representativeness heuristic may come into play. Which jacket? You're going out for the day and as you leave the house, need to grab a jacket? Which jacket will you wear? Relying on the representativeness heuristic may involve opening the door to see how it looks outside.

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Imagine this is what you see. The representativeness heuristic will quickly have you reaching for your coat, both because the weather outside matches your mental representation of weather that needs warm clothes, and your neighbor, who is already outside, is wearing a coat that is representative of your stereotype for winter. In no time, thanks to heuristic reasoning, you have made the right choice and are on your way.

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Remember this scenario? You're walking down the street. A stranger smiles and says hello. What do you do? Do you say hello back? Do you look away and pretend you didn't notice? How can the representativeness heuristic come into play here? Consider pausing the video and analyzing this example. What can you come up with?

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Heuristic reasoning may have you categorizing the person who is greeting you based on their visible characteristics, their body shape and size, their face, their hair, their skin, their clothing. Based on categorization, you may be more or less likely to say hello back. Another possibility is that you categorize the situation someone greeting you on the street, and you generally associate one greeting with a reciprocal greeting.

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You are likely to automatically say hi back before you have even fully become aware of who has greeted you. As with the availability heuristic, this process is activating existing mental representations and using them to guide your current behavior. Generally occurs quickly and without your conscious awareness. Like in my previous video, I encourage you to take some time and think about your own experience.

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Trace back to your day and think about all the split second decisions you made. Did any of them rely on the representativeness heuristic, and how? This will solidify your understanding of this heuristic, and will also likely show you how prevailing this heuristic is, and how much we rely on it on a regular basis. Perhaps even more so than the availability heuristic.

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I hope you are also starting to see the similarities in the differences between these two heuristics, in terms of their underlying cognitive mechanisms.

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Now, as we did with the availability heuristic, let's come back to our initial definition of heuristics as mental shortcuts and the positives and negatives that come with that. And consider these outcomes specifically with respect to the representativeness heuristic. Again, I hope you can appreciate the utility of heuristic reasoning and the fact that it often leads to relevant and favorable outcomes.

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One specific thing to point out is that once we are relying on the representativeness and activating semantic knowledge, given the current context, we're also activating typically related knowledge that is not explicitly present in the current context. This additional knowledge can be very relevant to decision making. For example, seeing that it is snowing outside will also tell you that it will likely continue to be cold for the rest of the day.

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The traffic may be slow, the sidewalks might be slippery, the bike lanes might not be usable, and so on. You can then quickly make decisions not only about what jacket to wear, but about footwear, transportation, and so on. On the negative side, with respect to categorization and

relying on prototypes and stereotypes, there are a lot of potential errors and oversimplification that may result from using the representativeness heuristic.

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Let's consider the greeting scenario. First, categorization may be incorrect. Your perception of the person greeting you may be confounded by the few superficial characteristics you focus on. For example, the worn out and dirty clothes may have you thinking that they might ask you for money, which has you quickly moving to the opposite side of the sidewalk. But really, they might simply be coming from a volunteer event at the nearby park and have been pulling out invasive plants

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all day. Wouldn't you want to say hi to someone like that? Secondly, the retrieved category may be unpredictable or irrelevant to the current situation. For example, let's say you categorize them based on their age or gender. Again, because of our rich semantic representations, you now have activated a lot of other knowledge you have with respect to that social category.

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But is that relevant to whether or not you say hi? Doesn't seem like it should be. Finally, relying on a prototype or stereotype may be misleading. That's likely a very obvious point. Even if we correctly categorize the person, the general knowledge we have about that category might not be true of them. In our example, even if the person is someone in need, this doesn't mean that they're going to ask for something from you and you have no knowledge of their specific circumstances.

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Perhaps you smiling at them and saying hi will make a world of difference for them and not cost you anything. For those reasons, it might be better to sometimes suppress or question the decision or behavior quickly provided by heuristic reasoning, and instead engage in more effortful processing and individuation.

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I hope this was useful to build some foundational knowledge about mental representations and semantic memory, and how these cognitive structures give rise to thought and behavior in social context.