

00:39.36 The idea is that the different concepts- It's hard for us to understand how those concepts are concepts of the same thing, but that's because we don't have the concepts well enough spelled out. Now, I have another point, but I think I don't have time, so I think I will stop.

SUSAN CAREY

00:39.54 I need your-

APPLAUSE

GARY TUBB

00:40.00 Thank you very much. Our next response will come from Susan Carey, who's a Professor in the Laboratory for Developmental Studies at Harvard University.

SUSAN CAREY

00:40.13 I want to thank the organizers very much for inviting me. I knew nothing of the fascinating Indian philosophical tradition and was really

blown away by reading Professor Dreyfus's paper, in which he brought out an aspect of that tradition that makes it continuous with the- or highly overlapping with the Western philosophical tradition that began with the Greeks and exists today in both phenomenological and analytic philosophy.

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Now, as he said, Dharmakirti was primarily a philosopher and his concerns were ontological and mainly epistemological. But in answering these questions, just as did the philosophers in the Western tradition, he became an armchair psychologist.

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That is, he made assumptions about the mind, which are actually empirical assumptions. And sort of my goal here is to just illustrate with, in a very short little case study, what modern cognitive science has to say about some of those assumptions.

00:41.49 Good. So, here is the caricature that I'm setting this up. What he said, according to Dreyfus - and I would very much like to be corrected if I have misunderstood - is that the mind is characterized by its ability to apprehend and cognize objects. That is intentionality is what makes minds different from other things in the world.

00:42.20 And then his question is, what enables the mind to do so. And his answer is- he developed a theory of aspect, which overlaps greatly with modern notion of mental representation. And the idea is that aspects mediate between the external world and consciousness and cognition and in order to do that mediation, aspects must have some properties of objects.

00:42.47 And he offered a resemblance theory as the answer to that. And they also must be of the nature of consciousness. That is they must be mental entities. And an aspect of the paper which Professor Dreyfus didn't summarize is that he

made a very sharp distinction between perception and cognition.

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Perception is unmistakable. The world is given to our senses, which causally determine aspects which resemble the represented objects. And that's what grounds his epistemology. In this way, he's making a move very similar to the British empiricists.

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And then these are interpreted by our thought processes. So there's a sharp dichotomy between perception and cognition. Perception is unmistakable and conception is mistaken. This is another aspect of the paper that Professor Dreyfus didn't summarize.

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Conceptual categories are a construction. And he was a nominalist. He thought there was no property of dog-ness for dog to pick out. So insofar as our conceptual system commits us to

that property, it's mistaken. It's necessarily mistaken.

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And language and language learning play a crucial role in the construction of these conceptual categories. So that's how I understand his views. I think there's a lot to say about these views. I think you can look at modern science as vindicating them to a certain extent.

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It's a matter of detail, not of large project. Now, modern cognitive science certainly denies the resemblance theory of perception. Representations do have a dual aspect. They have intentional content, that is they do refer to things in the world. That's what makes them representations.

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But they- and they also have a computational role in thought processes. So that's the dual aspect that he was looking for. I'm not talking about

consciousness now. I'm talking about representations that support knowledge.

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But as I'm going to show you, the distinction between perceptual and conceptual representations is difficult to draw. But, consistent with Dharmakirti's concerns, modern cognitive science does seek to find the natural kinds among representations. Ok.

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So, the two aspects of these theories that I'm gonna question is what's the role of language in constituting thought. And so you can ask that question - can non-linguistic creatures, animals and infants, for example, think? Now, this is actually a question that's debated in modern cognitive science.

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There are many philosophers, for example, who think that it's- under the right interpretation of what thought is, the answer to this question

is clearly no. And how really do we draw the perception/cognition distinction?

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So, I'm gonna give a worked example of a particular thesis in modern cognitive science that I adhere to - the core knowledge hypothesis. And I'm gonna take as my example - maybe confusingly - core knowledge of intentional agency. So this isn't- What I'm gonna try to show you is that we have - we and non-human primates - have innately representations of the content intentional agent.

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Now, this isn't answering Dharmakirti's concerns. I could have chosen number or objects or mechanical causality, but I chose this particular one. Ok. So, what's the core knowledge hypothesis? There are many distinct systems of domain-specific mental representations that have conceptual content.

00:46.48 That is, they go beyond sense data. Their acquisition is supported by innate, domain-specific learning mechanisms and there are innate, domain-specific input analyzers that identify the entities in those domains.

00:47.04 So, the idea here is that there are representations that have some of the properties of perceptual representations, in that there are innately given - thanks to Darwin - input analyzers that identify the entities in those domains, but they don't represent by resemblance and they certainly have content that goes beyond sense data that you can think of in terms of phenomenal experience of things like red or shape.

00:47.38 They're very often evolutionarily ancient and they remain constant through development. So these representational systems, which are just one kind of representation we have and a very special class of them, are never overturned

through conceptual change. The ones that babies have, we as adults still have, as well.

00:48.00

Ok. So it's an empirical claim that there are representations with these properties and I'm gonna give you an example of one such system. And the example I'm gonna give is people and other minds - knowledge of people and of their minds. Representations of people and of their minds.

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Ok. So let me just get started right away. First, there is evidence that babies and chimpanzees, for that matter, have innate representations of faces. And there's tons of evidence - I'll just give you one experiment. One experiment - a famous one by Andy Meltzoff and Moore - is they took brand new- newborns, two-hour old babies and put them in a situation -

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this is an older baby, but the experiments were done with neonates, as well - in which, they modeled certain facial gestures, like sticking

out a tongue, opening a mouth, pursing the lips. And what you see is that the babies imitate the gesture that was modeled. And they saw this in two-hour old babies.

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Now, recently, Matsuzawa, who is a primatologist in Japan - this is an amazing photograph, because he's in the room with a mother and a neonate. I mean, this- Chimpanzees are very, very dangerous animals, so that's already an astonishing photograph, but what he's doing is the Meltzoff and Moore facial demonstrations. And what you see is the baby imitating the tongue protrusion, the mouth opening and the lip purse.

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So, the conclusion from this is that humans and non-human primates must have innate representation of faces. Right? I mean, they cannot have learned these in minutes. But, these go beyond mere resemblance. Because there's an innate correspondence between the appearance of a face and their own facial gestures, right?

00:50.01 These innate representations have a computational role. Now, what the function of this is, why they're motivated to imitate, that's another long story. Ok. Now, representations of people of course go well beyond what people look like and the gestures they can make.

00:50.21 People are, as Dharmakirti insisted, totally different from other objects because they're agents with minds. So, is there any evidence that babies have innate representations of agents as intentional beings? So is that part of the computational role of babies' representations of people?

00:50.44 And the answer is yes, there's massive evidence. I'll just give you a feeling for some of it. So, here's a kind of experiment that shows that babies represent agents, actions as goal-directed. That is, as directed toward something in the external world.

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So, it's the notion of a goal that's the intentional concept in this case. Now, these experiments- The question is how do you find out whether a five-month old or a four-month old represents other people's actions, in terms of goals.

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The experiments essentially show babies events over and over again until they get bored with them. And then they change the event to see what the baby notices as different and from that, they reconstruct how the baby was representing the event. So that's the methodology. It's very simple, because of course, you can't ask them.

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So here's a simple experiment. Babies are habituated, they're shown over and over again a hand reaching in and grabbing a- I don't- Does that show? Oh, good. Grabbing a ball. So, they're showed that over and over again, until they get bored looking at it.

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Then what happens is the baby is- the location of the ball and the teddy bear are switched. And now the hand either reaches in and grabs what's obviously a very different location from what the babies were bored to, but the same object. Or reaches in with the same path and grabs the old location, but the new object.

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And the question is, to which does the baby generalize the habituation. And the answer is, they notice. They look longer. They show surprise if the goal changes and not the location changes. Now, it's not just that the babies' attention was drawn to that ball because the hand contacted the ball. Because if you repeat this experiment with a mechanical claw-

00:53.03

So, like a dishwasher sponge at the end of a stick. Now the baby dis-habituates to the different path. So it's like they can't see a

dishwasher stick as the kind of thing that can be goal directed.

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But, now the question is well, what's the input analyzer that enables the child to identify the hand as something that could be goal-directed and not the stick. It could be that the innate person representations tell them hands are parts of intentional agents. That could be, but another thing they're able to do is to analyze the motion of these entities.

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So if you make this stick approach the goal in three different paths - so you have evidence that it's taking different paths to get to the same goal - now, they treat the stick as if it's goal directed, as well. Ok.

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So, I'm not gonna have time because I've overestimated how much I could do, but another kind of intentionality that babies are sensitive to is when people are making reference to things

in the world. So, they understand emotional expressions as referential. They understand eye gaze and pointing as referential.

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Ok, those are also intentional attributions. So, the conclusions from this work is that agents are identified by patterns of contingent interaction with entities in the world. And agents' actions are represented as intentional, goal-directed and referential. And these representations go wildly beyond sensory representations.

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I do want to tell you one little experiment because I think this shows you how rich this innate system for representing other minds is. This is an experiment that shows that babies know that seeing leads to knowing. Ok. This is much richer than content than anything I've shown you before.

00:55.19

And I can tell you the experiment very simply. It's based on the Woodward paradigm, so the

babies are familiarized with somebody putting an object into a box and then reaching into the box. Ok. So, if you're reaching for an object, you're reaching for a hidden object.

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And then, when the person isn't looking or is looking, the object is moved to the other box. So the important thing is either the person sees or doesn't see the object moved. And then, the person reaches, either where the object really is or where the object they would think it was if the child is taking into account whether they saw it moved or not.

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And the pattern of looking shows that they monitor all of that. That they look longer when the person reaches where that person should not think it is. Ok. This is very, very complex theory of mind that's being revealed in pre-linguistic babies and also by the way, non-human primates, show these same phenomena.

- 00:56.27 Ok. So, conclusions. Infants have innate eye detectors, they understand the referential function of gaze and pointing. They understand that people gain information from what they attend to. And these representations are integrated with representations of the goals of actors.
- 00:56.46 So this is a very rich inferential system of core knowledge. And it has a long evolutionary history. Ok. As I said before, the finding that human infants have representations of intentional agency is not meant to bear on Dharmakirti's questions concerning what it is about minds that make intentionality possible.
- 00:57.09 It's just an example of a core knowledge system. But it's a example that questions aspects of his theories. That conceptualization is constituted in the course of language learning. And that there's a sharp distinction to be made between perceptual and conceptual processes.

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But, very much- And it's a system of representation that satisfies all of these principles. But, what I want to emphasize is that these systems of core knowledge, as I said also before, differ from later, fully explicit linguistically-mediated knowledge.

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That what is happening in cognitive science and in cognitive psychology is a research program that takes the notion of mental representation as unproblematic and is studying the nature of the format, the computational role and trying to find what the kinds are and what the right distinctions are.

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And I think that perception cognition the way he drew it - the resemblance theory of perception is not gonna work out. But he, and in fact the Western philosophers who invented the notion of representation as well, I think are borne out by

the science in terms of their basic insights.

Thanks.

APPLAUSE

GARY TUBB

00:58.57

Thank you very much. Our final response is from my fellow Sanskritist, Stephen Phillips, who's a Professor of Philosophy at the University of Texas at Austin.

STEPHEN PHILLIPS

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So bring your minds back to the 7th century, CE. Professors Block and Carey have done a wonderful job at showing how Dharmakirti can stimulate contemporary philosophers and engage them in coming to some very difficult problems and theories.

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But what I'm gonna try to do is give you a sense of Dharmakirti's philosophy in the context of classical Indian thought and the opposition to