



Mind & Life Podcast Transcript

Larry Barsalou – Habits of Mind

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Opening Quote – Larry Barsalou (00:00:02): *One thing that humans do that no other species do is to develop a concept of ourselves. And we come to see these self-concepts as real things, that this is who we are, this is our person, which in a way is an illusion because our person is a lot of other things beside that. But we come to identify so strongly with these concepts, that that's who we think we are. And I think the contemplative practices try to make us aware that these are just concepts. If you can change your perspective on a thought—from seeing it as a real event, to just seeing it as a thought—it no longer has the control over your behavior, you can just drop it and move onto something else, then I think the same thing might be possible with self-concepts.*

Intro – Wendy Hasenkamp (00:00:45): Welcome to Mind & Life. I'm Wendy Hasenkamp. Today I'm speaking with psychologist and cognitive scientist, Larry Barsalou. Larry is a professor of psychology at the University of Glasgow in Scotland, where he studies the mind through the lens of what's called grounded cognition. This refers to the way our cognitive processes—like attention, memory, thinking, planning—are completely interwoven with, and dependent on our senses, our bodily processes, as well as the physical and social environment we find ourselves in. And Larry would probably never admit this because he's an extremely humble person, but colleagues routinely say that his work around grounded cognition has completely revolutionized the field of cognitive psychology.

(00:01:34) If this way of thinking about the mind sounds familiar, it's a view that's embraced by many in contemplative science. It's sometimes also called 4E cognition, which came up in the episode with Evan Thompson. That's the idea that the mind is embodied, embedded, enactive and extended. These views also fit nicely into frameworks put forth in previous episodes with Lisa Feldman Barrett, Anil Seth, and Andreas Roepstorff, for example.

(00:02:02) So Larry and I begin our conversation talking about grounded cognition, and he gives basically a masterclass on the history of cognitive psychology, discussing how our views of the mind and ways of studying the mind have evolved over the last century or so. I always find it fascinating to learn about the history of science. I think it's really important to remember that the underlying frameworks we have about our minds are always changing.

(00:02:30) We also talk about simulation and prediction in the brain, what exactly a concept is and the benefits and harms of having them, and we get into stereotypes and implicit bias, and how we might be able to change those things. Larry then describes what he calls the situated action cycle that drives our behavior. (I put a figure in the show notes, if you'd like to refer to it, it might be helpful.) And that gets us into his current work on habits. He's been particularly focused on health behaviors like eating and

stress. And we talk about the critical role of mindfulness in breaking unhealthy habits and forming new ones. We talk about our self-concepts, and how meditation can help us move beyond them, and we wrap up with Larry reflecting on the opportunities and challenges for researchers, given the critical importance of context for cognition. For example, how can we study the nuances of our situations in the controlled environment of the lab?

(00:03:34) As you can hear, this episode is yet another deep dive. We get a little bit into the weeds, and the information is pretty dense, but it's awesome. So you may want to listen more than once to really be able to take it all in. I spoke with Larry during the 2019 Mind & Life Summer Research Institute, which is sometimes called the SRI as you'll hear in this episode. And as always, there's some great information in the show notes if you want to learn more.

(00:04:02) It was such a joy to speak with Larry about his work and to hear how it's been evolving into more applied spaces. I think Larry's research is a beautiful example of how traditional, basic science about how the mind works can be applied to meaningful everyday experiences like working with stress and habits. I hope you enjoy this conversation and maybe it will make you think a little differently about your own habits of mind. It's my pleasure to share with you, Larry Barsalou.

Wendy Hasenkamp (00:04:33): Well, I'm here with Larry Barsalou. Larry, welcome and thank you so much for joining us.

Larry Barsalou (00:04:37): Well, thanks for inviting me to do this. I've been looking forward to it.

Wendy Hasenkamp (00:04:42): So your work has been really foundational in cognitive science in the ways that scientists have come to think about how the mind works. And a lot of that is based in a theory called grounded cognition, which is very different from the way that scientists used to think about the mind. So could you describe grounded cognition?

Larry Barsalou (00:05:01): Sure. I'd be glad to. It might help to put grounded cognition in its larger context, so I'll go back to the beginning of scientific psychology, which was the late 1800s, early 1900s. Prior to that point, the mind had been largely examined through philosophy. I mean often very careful analyses, but not based on the scientific method where we develop theories, and test them with hypotheses, and collect data to test those hypotheses.

(00:05:32) And the first experimental psychologist started to do this, again in the late 1800s and early 1900s. And the movement that won out at that point was behaviorism. And behaviorism basically argued that a good science of psychology would only focus on things that we could observe—stimuli and responses and reward—and that it was not useful to talk about things that were going on inside the head, which other movements at the time were doing. And they were doing it in ways that were problematic scientifically. And so behaviorists eventually sort of won that argument, and they took over for 50 years in the US and the UK.

(00:06:10) And then in the '50s and '60s people started to realize that you just couldn't understand human behavior, human intelligence by just talking about things that you could see in the environment and in behavior. And so there were excellent arguments made for why it was essential to talk about what was going on inside the head. And so there was a tremendous debate at the time about whether this was the right thing to do.

(00:06:41) And an important property of what happened at this point, which will become significant for grounded cognition eventually, is that the new way of thinking about psychology, that was essentially cognitive and talking about things that we couldn't see inside the organism, was very much inspired by the development of computers at that time, and believing that it was useful, and it was powerful, to think about the brain as an information processing device. And for a while this metaphor was taken very literally. It became increasingly well understood that taking it too literally was not really accurate or useful, and broader and new forms of thinking about computation developed that were more appropriate for talking about computation in a biological organism, and eventually the brain. But at the same time, this computational account during that period viewed cognition largely as a module within the brain that did abstract symbol processing, very much like the symbol processing that occurs in logic and in mathematics and statistics.

Wendy Hasenkamp (00:07:55): Is that how it's done in computers?

Larry Barsalou (00:07:56): Yes, indeed. Or at least in those computers at the time. I mean basically, various kinds of logic machines. And these logical languages were quite useful in getting computers to do new important kinds of things that had never been done before, and a lot of people became convinced that that way of doing things was how our minds worked. And that approach to cognition began in the '50s and '60s with [Noam] Chomsky and with various areas that came out of human factors.

(00:08:34) And it persisted until the '80s when... the first big challenge to it came when people started thinking that rather than being logical and symbolic, that human cognition was more statistical. And this was all the new work of connectionism, neural nets. So there was a big debate at the time between these two groups about whether cognition was based on these more traditional forms of computation, or on more statistical forms of computation. And so that was the first softening of this original view that the brain is like a computer.

(00:09:11) Probably the next big thing to happen was sort of the development of neuroscience. As we developed new tools for measuring the brain using the various kinds of imaging—fMRI, EEG—this started to have a large impact on cognition as well, in terms of thinking of it as a more biological process. And that further challenged the classic way of thinking about cognition as a symbolic process.

(00:09:42) Grounded cognition would probably be the next major challenge to that view, and the next major growth of how we think about cognition. Because I think all these changes in perspective are all, I think, generally correct. I think it is correct to think that the brain is a statistical system. It is essential to think of it as a biological device. And I think the grounded perspective that came next is also essential to having a proper understanding of the brain. And basically what the grounded perspective added to all of this was to say that cognition is not a self-contained unit.

(00:10:20) Even into the statistical accounts of cognition, it was largely viewed that there was some kind of computational system, that was largely self-contained, that manipulated information (either in the form of symbols or statistical vectors) to support all the kinds of intelligent cognitive things we do, from high level perception to representing knowledge, having memories, understanding language, problem solving, planning... It was largely assumed that we have these relatively abstract, and what various people have called "amodal" representations. And amodal here largely means that they're just arbitrary symbols that are different from, say, perceptual representations in vision or audition, but that cognition was largely a self-contained unit using these internal representations.

(00:11:11) And the grounded view, for the first time, argued that cognition wasn't a self-contained module, but it utilized all sorts of things that would traditionally not have been considered "cognitive." So for example, that cognition would rely on the perceptual systems for representational purposes. As an example, consider color words like yellow and green and blue. Rather than there being an arbitrary symbol that represents the information associated with these colors, the idea from the grounded perspective was that when you think of yellow or you think of blue, you're actually activating the color parts of your visual system and you're turning them on, you're running simulations of what it would be like to experience blue or yellow.

(00:11:58) And these simulations could be conscious, you could actually be having a conscious experience of yellow, or it could be unconscious. You might be activating the color system in the way that it would be processing an object that you're not really paying a lot of attention to, but it's nevertheless registering its color. But the idea would be that these color words—and these concepts—in the cognitive system are being implemented to some extent by representations out in the modalities, which at the time was heresy. People thought this was the craziest thing that couldn't possibly be correct.

Wendy Hasenkamp (00:12:31): So meaning that the way that our minds represent information is using the actual perceptual information that it's built on in the first place. There isn't something different than that.

Larry Barsalou (00:12:40): That's right. In these more traditional theories, you would have the visual system performing color processing that's associated with what you see. But then when you think about the meaning of yellow, that's actually represented in a separate system, in a completely different kind of format, some kind of symbolic or statistical format. And then somehow, and this was the classic symbol grounding problem, is how you would relate...

Wendy Hasenkamp (00:13:04): How do you map it?

Larry Barsalou (00:13:05): Yeah, how do you map. Whereas the grounded view would say, well, you just have one representation.

Wendy Hasenkamp (00:13:10): Yeah, it seems much more parsimonious.

Larry Barsalou (00:13:11): Indeed.

Wendy Hasenkamp (00:13:12): It almost seems extra complicated to think that there's a whole other system.

Larry Barsalou (00:13:17): Yeah. I mean, it's challenging evolutionarily to try to explain where this new system came from, that supposedly isn't in any other organism. Whereas if what you're doing is you're just using the same system and perception that you're using to represent knowledge, we could assume that non-humans would have this, and that this would just be a natural evolutionary progression as humans add other things on top of that like language and greater ability to control those representations with regulatory processes.

Wendy Hasenkamp (00:13:45): Interesting. So is that now the dominant view within cognitive science? I feel like we often, at least in the public discourse, still hear the old computer metaphor. Terms like "information processing" and things like that are still very commonly used. But is it really... has it swayed?

Larry Barsalou (00:14:05): Well, first of all, I would view grounded views as still information processing and computational. It's just a different kind of computation. But it's still... I mean, I think the brain is clearly a computational device. And I would assume that when you're running a simulation, for example of yellow, that that's... you can very readily talk about a computational model that would implement that.

Wendy Hasenkamp (00:14:29): OK. So you've used a couple of words that I want to unpack a little bit—one is simulation and the other is concept. So what do you mean when you say we're simulating the idea of yellow or the experience of yellow, when we think about yellow?

Larry Barsalou (00:14:46): Well, so one of the core ideas in grounded cognition is that when you see something that's yellow, like a yellow lemon, it drives your visual system into a particular state of activation, including parts of the visual system that represent the shape of a lemon, parts that represent the texture, the color. And all these perceptual systems are highly hierarchical. So there would be multiple levels of representation from very specific to increasingly general and abstract within the visual system that is coding all of that information about what it is you're seeing. And both for how it looks, but also for what it would be like to interact with—what its width would be if you were to reach out and grasp it and so forth.

(00:15:32) And so the idea is that as you're actually seeing a lemon, your brain's being driven into this state, and then you have memory areas, association areas that capture the state of activation in the visual system. And even within the visual system itself, there are memory mechanisms, implicit mechanisms that can essentially capture a record of the state that the system's in. Once you've got this record in the brain—and this would be a kind of a statistical representation, a strengthening of associations between all of these elements of this representation that's been activated bottom up from perception—and imagine that gets associated with the word lemon. (There's a whole bunch of stuff there that I'm not going to lay out, but just assume that it does.) Later when you hear the word lemon, it could reverse activate that pathway. So activation could trickle down from the word lemon into the higher-level regions of the visual pattern that had become established when you saw a lemon. And you could reactivate that pattern that you had experienced when you saw a lemon, maybe just partway down to the higher-level representations, maybe further down. And there's actually evidence for this in the literature that we can control, even for color, how far down the visual system we activate when we represent that information.

(00:16:46) And what's I think really significant about this idea, is that this is a really natural way to represent information about something in its absence. So if you don't have a lemon in front of you and I say the word lemon, you know exactly what I mean. And so the question is, how do you do that? And simulation, this process I just described, is a natural way of thinking about what happens, is that you just reactivate the pathways that would become active if you were actually interacting with the lemon. They'd been stored in memory using association areas, and that under various circumstances where you need to generate a representation of a lemon, you just reactivate these pathways.

Wendy Hasenkamp (00:17:25): So it almost sounds like, then you would be creating a hallucination of a lemon. But is it a lower-level activation or... Because you don't actually see a lemon when you say the word lemon.

Larry Barsalou (00:17:39): It is indeed important to usually try to be able to distinguish between a simulation and an actual perception. And we know there are cases, like in psychosis, where people run into problems. There are all sorts of experimental demonstrations showing that even people who aren't psychotic can easily confuse a simulation with a perception.

(00:17:59) So there are experiments where you actually have people look at lemons, or you just have them imagine lemons, and later you ask them, "Did you see a lemon, or did you imagine it?" And sometimes when they imagine it, they think they actually saw it. The richer the imagery they had when they imagined it, the more likely they are to think [they saw it]. So these simulations, they appear to be close to perceptions. I think it's an interesting question how we usually keep them apart.

(00:18:22) That memory example is a bit of a strange one because you're just being asked to remember whether you actually saw it. And it's a little bit different from being in a situation where—are you thinking of a lemon, or is there one on the table? And I think there are really important differences in those two situations that our brains are normally able to tell apart. So if you're actually getting bottom-up information from a lemon on the table, your visual system is going to be in a very different state than if you're just imagining a lemon. So when you're just imagining a lemon, you don't have all this bottom-up information from the lemon on the table. And I think there are all sorts of motor things about interacting with things. Usually we're interacting with the things that are around us, and this is a very important source of information about what's real. You can always come up with interesting cases and illusions where these things get confused, but generally I think we're able to keep them straight.

(00:19:17) – *musical interlude* –

Wendy Hasenkamp (00:19:36): And so these simulations, it sounds like from what you're describing, they integrate the sensory information from all the different senses as well as language information that you've learned, and maybe other experience that you've had with that item. How does that then relate to a concept, the word you used earlier of a concept? Is that the same thing or...

Larry Barsalou (00:20:01): Well, there's sort of two things there that I would like to say a few words about. One is the notion of a concept, and the other is the other things that that information gets associated with. So let me start with concepts. So the way I think most people think about what a concept is, is that it's aggregated information and memory about some kind of thing. So our brain naturally divides the world into categories—chairs, tables, birds, pizzas, apples. We know thousands and thousands of these categories. And our brain, there are all sorts of principles by which it does this.

(00:20:42) And a concept can be thought of as the knowledge that you've accrued about of those categories. So if your brain has created the category of a chair, you have lots of interactions with these things. And because it's been viewed as a category, the memories that result, which every time you interact with anything, a memory becomes established—somewhat implicitly, incidentally, in your brain. You don't have to be trying to remember this, it's just the nature of your brain. And you might have to process it fairly deeply. There might need to be some attention at least applied for that process to take place, but everything gets stored, especially that's attended to.

(00:21:18) And so if you attend to instances of a category like chairs or birds, information is going to get stored. And the brain has powerful ways that we still, I think, have a lot to learn about, but it pulls all that information out of those instances of the category, and aggregates it together. One natural way of thinking about this are these neural nets that I mentioned earlier. They have very powerful mechanisms for extracting the statistical information from a set of things that belong to a category and forming higher-level representations of the information that distinguishes that category from other categories. And that information is typically what's referred to as a concept. It's a representation of the category that can be used to identify future instances. So when you see another chair, your concept of a chair becomes bound to it. Whereas it's much less likely that the concept for a bird will become bound to it, because the features in chair match this new chair you're looking at better than the features of a bird. So the concept becomes active and now you know what that thing is.

(00:22:23) So concepts are used to identify things in the environment, and they can also be used to represent things in their absence. So again, if I say the word chair, you can activate all the statistical information that's become aggregated for the category, and that can give you a sense of what the category is. And again, if that's been captured in a multimodal manner across how chairs look, the actions you perform with them, what it feels like to sit in one, how you feel emotionally, all that stuff becomes active.

(00:22:54) And this is the second thing that I wanted to talk about, and it's something that I like to refer to these days as the situated action cycle. And the idea is that, typically we're engaged in a cycle of processes over and over again in the course of our daily activities. And this cycle can occur in a lot of different ways, but perhaps most prototypically what happens is that something appears in the environment that we perceive an entity, an event. And the first thing we do is we recognize it using a concept. So we say, "Oh, that's a chair, that's a bird, that's a piece of pizza," whatever. And as soon as we know what it is, because we've encountered this kind of object before and we know what roles it can play in our lives, we generate what I like to call these days as self-relevance. And this to a large extent is being generated... information about self-relevance is stored in every concept for every category. We know exactly what its role in our lives is. When we see a chair, we instantly know how it can be relevant for us. And so we activate that information.

Wendy Hasenkamp (00:24:04): So you would know how to use it, what good is it? Which seems a very useful system to have in the brain.

Larry Barsalou (00:24:12): Indeed.

Wendy Hasenkamp (00:24:13): Also, it's completely foundational for language, being able to communicate. Every word is basically a concept, is that right?

Larry Barsalou (00:24:21): Absolutely. Yeah, words are associated with concepts.

Wendy Hasenkamp (00:24:23): And yeah, so I could see how that makes it so much more efficient to process the world... to interact in the world.

Larry Barsalou (00:24:31): Indeed. Yeah, no, it would be... without concepts that we would be starting from scratch every moment. Concepts give us expertise at recognizing things in the world, and knowing what they're going to do and how to interact with them.

Wendy Hasenkamp (00:24:48): So they're essential, it sounds like, for our survival.

Larry Barsalou (00:24:50): Absolutely.

Wendy Hasenkamp (00:24:52): How about other animals or other organisms? Do they have concepts? Or if not, how do they survive without them?

Larry Barsalou (00:25:00): Certainly. Yeah there are scientific literatures on concepts in a wide variety of species, but basically they need to recognize things too, and they need to know the significance of those things for themselves. So just to continue on a little further with the situated action cycle. So the idea of significance is... and I think it's especially interesting in humans to think about this kind of self-relevance that gets produced. It's not just the goals, sort of how we can use it, but also how related it is to our values, what the social norms are for using it. There are a wide variety, I think, of social, cultural things that get activated at this point. As well as simply the utility for our goals. But all this stuff becomes active.

(00:25:47) And then it starts to, if it's relevant, starts to produce appropriate interaction with the object. And an important stage that lies between the computation of self-relevance and action would be various kinds of affective states. Like once you know what something is and what its relevance is for you, this may generate some emotion, which could be most basically associated with wanting to approach the object or avoid it. And then this can also... at this point motivation can be introduced, such as if you want to consume a food, drink a beverage, or a wide variety of other kinds of motivations that you might have towards things in the world, become generated. Once you have these motivations, they can then lead to actions where you're now interacting with the object.

(00:26:37) And I would basically argue that concepts contain all of this information. They contain information so you can recognize the object, you know what its relevance is for you, you know what the typical kind of affect and motivation you have towards this kind of thing, you know the typical kinds of actions you would perform with this kind of thing, and finally the outcomes—whether it's rewarding, punishing or something else, whether the rewards are immediate or long-term.

(00:27:02) And so that's the situated action cycle, is: 1) something occurs in the world, you perceive it, 2) you compute self-relevance across all those dimensions, 3) you have affective states, 4) you have action, and then 5) outcomes. And in the grounded view of concepts that I really resonate to these days assumes that concepts capture the situated action cycle. That's their job. Because as soon as you see something, as soon as you see a glass of wine, for example, it just triggers the situated action cycle associated with wine. And you know immediately how it's relevant for you, you know whether you would want approach or avoid it, how you would drink it, and what the outcomes would be. It would taste good, it might make you feel good...

Wendy Hasenkamp (00:27:44): Right. And all that seems to happen instantaneously.

Larry Barsalou (00:27:47): Yep. Yep. And again, the argument would be, from a grounded perspective, a lot of people argue that this is really the fundamental, the most important role of concepts is to provide inferences. It's not just to recognize things. So if there's a glass of wine there, it's nice to recognize a glass of wine, but it's much more useful to know what its potential role is in your life, and how to interact with it and so forth. And these would be viewed as inferences. And so, from a grounded perspective, all these inferences are coming from the situated action cycle. And finally, all of these

inferences are being implemented in simulations. You're simulating what it would be like to interact with this object. It's actually starting to produce the emotion, perhaps.

Wendy Hasenkamp (00:28:29): Right. So this is also making me think of models of the brain and mind that put prediction as a central goal. Is that the same, what you mean by inference?

Larry Barsalou (00:28:40): Totally, totally, yep. A lot of the current views that focus heavily on prediction, like predictive coding, are very much in this spirit. They aren't necessarily grounded theories, they aren't necessarily committed to simulations, even though I think many of the mechanisms that they use and phenomena they talk about would be very close to simulation. But yeah, no, it is all about prediction. Our brains are prediction machines, and that's what allows us to survive and be effective in the world to a large extent.

Wendy Hasenkamp (00:29:10): Right. So that also seems a pretty big shift from how we used to think of the brain as kind of a stimulus-response, and there's some computation in between. Prediction really places a lot more emphasis on using what's already known, and prior knowledge to be able to make inferences and then predict what might happen. That kind of thing?

Larry Barsalou (00:29:30): Indeed. Yeah. It's not just, you see a stimulus and you ballistically produce a response. There's this whole chain of inferences that's associated with action, that... not only the action itself, but whether you should approach your void, motivation, goals, norms. And then ultimately what you expect the outcome to be and whether that's something you want. And so all of that stuff is getting produced when you see the object, not just a ballistic response.

Wendy Hasenkamp (00:29:59): Right. When you were speaking about concepts, it's clear how that's really useful in day-to-day life, interacting with objects, getting around in the world. To what extent does that also apply at more complicated levels, like interacting with other people? I'm thinking about when we interact with different groups of people, we have concepts that we've learned from culture, family, media... Have you thought about those things in relation to concepts?

Larry Barsalou (00:30:33): Yeah. I mean, I think the social cognition community and social psychology in general, that would be an excellent description of a tremendous amount of work that they've done on various topics such as person perception, stereotypes. Person perception would be drawing inferences about your goals and personality. Stereotypes, of course, sort of beliefs about various groups of people. Attribution theory, causes of... you know, what's causing your behavior. A tremendous amount of literature, which can essentially be viewed as documenting various kinds of concepts we have about people, the role that those concepts play in our interactions with people.

(00:31:18) And I think as you mentioned, those concepts to a large extent come out of the socio-cultural systems that we participate in. Different cultural groups have different conceptual frameworks for thinking about themselves and other groups of people. And by spending time with these various groups, we learn their conceptual framework, and we learn to apply it in our own interactions with people.

Wendy Hasenkamp (00:31:47): Right. So this is an example where concepts can not be so great, because they may not be accurately helping us in the world, or interact with people. Would you agree that concepts also can be problematic?

Larry Barsalou (00:32:02): Oh, absolutely. I mean, it sort of depends though, on what it is you're trying to do with them. So if your goal is to do things with people that we might not approve of, like discriminate or disenfranchise, then having a certain conceptual system that supports those activities actually is exactly what you want. It supports your goals. But from perhaps a broader perspective, where those kinds of activities are deeply problematic, then it's deeply problematic to have that conceptual system.

Wendy Hasenkamp (00:32:40): And so how can we shift concepts to be, in those cases where it's a much more complicated interaction, and individuals can't necessarily be lumped into groups?

Larry Barsalou (00:32:52): Well, in social psychology, there's a large literature on this, especially on stereotypes and prejudice. And all sorts of strategies have been suggested and tested for seeing whether it's possible to change people's stereotypes. And I should point out that these stereotypes are often being measured implicitly, even people who would explicitly say that they're not prejudiced often will demonstrate prejudice on implicit tests. It doesn't mean that they're consciously or explicitly or intentionally prejudiced, but the argument has been that there's just so much prejudice in the media and in the world out there that we just soak up and we don't even know we're doing it.

Wendy Hasenkamp (00:33:33): This is implicit bias.

Larry Barsalou (00:33:34): Implicit bias, as measured by instruments such as the Implicit Attitudes Test. So these strategies aim to change those implicit biases. And I actually recently read a review on this. Perhaps the most effective strategy is the counterexample strategy. So if you think a group of people is a particular way, you present individuals who demonstrate something different, so that you essentially get empirical data about the group that's different from your stereotype.

Wendy Hasenkamp (00:34:08): So you need more experience to kind of override your existing concepts.

Larry Barsalou (00:34:13): Yep. But I would imagine you would also need to be open to changing your views because I could imagine, if you weren't open to changing your views, those counterexamples might not...

Wendy Hasenkamp (00:34:24): ...might not land.

Larry Barsalou (00:34:25): Yeah, exactly.

Wendy Hasenkamp (00:34:26): It seems like that's, yeah, very relevant in a lot of areas of society today.

(00:34:59) – *musical interlude* –

Wendy Hasenkamp (00:34:59): So coming back to these ideas about simulation and the situated action cycle that you described, it seems like that has a lot of relevance for our day-to-day habits. I know you've been doing a lot of work on health behaviors and things like eating. Can you say how that plays in there?

Larry Barsalou (00:35:15): Sure, yeah. I think this is one of my favorite applications of the simulation construct. It seems to play absolutely central roles in many important things in our life. So in eating, for example, we're constantly simulating things we would like to eat, what we're planning on eating for

dinner. These simulations can often be so powerful that they increase our salvation as my collaborator, Esther Papies has shown. And they can even make us eat when we're not hungry, because we simulate the pleasure of eating.

Wendy Hasenkamp ([00:35:56](#)): I'm familiar with that behavior.

Larry Barsalou ([00:35:56](#)): Oh, it never happens to me. *[laughter]* And another way in which simulations can be problematic is, you may not be hungry but you walk into a room and there's attractive food present, and you start simulating what it would be like to eat. You immediately imagine what it would taste like, and how good it would make you feel, and the next thing you know, you're eating it and you don't need the calories and you're not hungry. So simulations play a central role—and this is probably the central focus of Esther's work at the moment—is that simulations drive eating behavior to a major extent.

([00:36:32](#)) So she's really interested in, for example, so people tend to eat too many unhealthy foods and not enough healthy foods. And she's really interested in, how do you get people to construct simulations of healthy food that will make them eat them more? And the same thing for sustainable foods. How do you get people to think about or simulate eating foods and the consequences of doing that, so that people will make better food choices? But the point of much of this work would be that once we get in one of these simulations going, we're in big trouble. Even though we might be watching our weight, we might have good intentions for sustainability and health, just the simulation of the pleasure takes over and...

Wendy Hasenkamp ([00:37:15](#)): Drives behavior?

Larry Barsalou ([00:37:16](#)): Drives behavior, absolutely. Another area that we've been really interested in is stress. And I think it's very natural to think about stress as again, involving simulation. That when we're stressing out over something, we're essentially simulating an event of some type that we're worried about—it's often referred to as rumination. But the idea would be that, again, you're running your brain as if this stressful event were actually taking place.

Wendy Hasenkamp ([00:37:43](#)): Right. So all of your hormone systems, stress responses being activated as if the thing were happening to you.

Larry Barsalou ([00:37:50](#)): Absolutely. Yeah, and for eating, it's the same thing. Esther's doing all this work on salivation at the moment showing that food simulations increase salivation, the more pleasurable the eating simulation is, the more you salivate.

Wendy Hasenkamp ([00:38:05](#)): So a really powerful example of the mind and the body being connected, there's just no distinction between them.

Larry Barsalou ([00:38:11](#)): Indeed, indeed yeah. Yeah, no, when you're imagining stressful events, you can activate neuroendocrine systems associated with the cortisol response. You can activate your immune system producing inflammatory responses. And all of this can be really hard on your body. Just the same way eating too much because of simulation is not good for you, having all these negative simulations that are running all these... basically producing what's called the physiological stress response in your body, to the extent that you do this chronically, can really hurt your long-term health,

both physically and mentally. And drinking would have the same kinds of simulations associated with it, and as would all potential health behaviors that we've thought about.

(00:39:04) So an interesting question becomes, how can we work with these simulations to decrease their effect on us? And perhaps the most classic approach is what's referred to as reappraisal. And it's also... Cognitive Behavioral Therapy has the closely related idea of creating new patterns to replace the old patterns—to think about the foods or a stressful situation in a different way, to think about a threatening situation instead as a challenge, instead of thinking about a tasty food as pleasurable, thinking about the effect that it's going to have on your body, both your weight and your long-term health.

Wendy Hasenkamp (00:39:42): Seems like in order to be able to enact strategies like that, you need to catch yourself in the moment, right? So you need some kind of awareness.

Larry Barsalou (00:39:50): These strategies are notoriously difficult to implement, and often fail. And it's usually because of the reason that you said, that you get so caught up in these simulations that you forget to apply them. But it's just basically the strength of your old habits takes over. You may have the intention to do these other things, but it is really hard to actually implement these intentions in the face of these habits. It's certainly ultimately an important thing to do. If you've got these sorts of problematic cognitive processes going on, it would be good to try to change them. And I think this was one reason why mindfulness practices have become so popular, is that they are often a very effective way of disabling these simulations.

(00:40:39) And I think it's interesting to think about what happens in a simulation. I think what happens in a simulation is that you mentally transport yourself into a situation where you essentially have the affordances that would normally be present, as if you were actually there. So for eating, for example, you transport yourself, if you're thinking about eating a piece of chocolate cake, you mentally transport yourself to a situation where you're sitting at a table perhaps, and the chocolate cakes in front of you, you can reach out, it's within your reach. You've got the utensils there to eat it, all the affordances are there to consume it.

Wendy Hasenkamp (00:41:20): Can you say what you mean by affordances?

Larry Barsalou (00:41:22): Affordance is a term that James Gibson contributed, which is essentially inferences about the... He would roll over in his grave if he heard me describe it this way, *[laughter]* but it's basically inferences about the situated action cycle that follow from recognizing an object. So as soon as you categorize something as chocolate, a bar of chocolate, the affordance would be the implications of that bar for your actions and for your self-relevance essentially.

Wendy Hasenkamp (00:41:52): OK, so all of the things that unfold because of it.

Larry Barsalou (00:41:54): Exactly, yeah, that would be the affordance. And so we can have affordances of objects, like a hammer affords grasping and pounding. Chocolate affords picking up and eating. And then being criticized by your boss affords sort of failure and low self-esteem. So there are social affordances as well as, certain social situations afford certain social outcomes. And so basically if in a simulation, you simulate it faithful enough so that everything's in place for these affordances to be satisfied essentially, or the conditions for the affordances are satisfied, you experience the affordance.

And this is what's so powerful about simulations and why they're so seductive is that you really feel like you could have the consequences.

Wendy Hasenkamp ([00:42:48](#)): So even the emotional outcomes are playing out.

Larry Barsalou ([00:42:52](#)): Exactly. And our brains are brilliant at running these simulations, and we often refer to this as subjective realism. Because we imagine the situations in such a way that the affordances are present, they seem subjectively real, and we get totally caught up in that, we get totally immersed. And we can be swept away. We can ruminate and worry, or just not stop thinking about eating whatever until you've actually had it. These thoughts can become so powerful that they take over.

([00:43:24](#)) And what mindfulness essentially does is to shift the affordances. So you've got this thought, so you're imagining your boss criticizing you. Rather than being in the office where that's happening and having this thought that makes it seem like that's taking place, you actually shift perspective so that you see that simulation just as something that your mind has constructed in the present moment. So now the affordances have really shifted. You're not in the situation with your boss yelling at you. You're sitting in this chair having this thought about your boss yelling at you. And that has very different affordances because if you're having a thought in the moment, what thoughts tend to do is they arise and they dissipate, especially if you let them. Or you could continue sort of thinking about it, but there's a different set of affordances. And if you can make this shift, then you can let that thought go. And you can do that for simulations of food, you can do that for the simulations that underlie stress.

([00:44:22](#)) And then if you've been able to do that, all of a sudden, you're just sitting there with nothing to do. You could replace that original course of situated action with another one. You could say, "Well, maybe I don't really need to eat something right now," or, "Maybe I'll just go have a piece of celery." Or, "Rather than thinking about my boss yelling at me, I'll think about maybe something I could do that would make her happy."

Wendy Hasenkamp ([00:44:46](#)): Right, this is great. So it sounds like, on this view, utilizing mindfulness and bringing that awareness of "thoughts as thoughts" as it's often described... So understanding that a thought is not actually really happening as it normally seems, it kind of undercuts all of the rest of that cycle that you described, and all of the outcomes that your body thinks it might be experiencing. And then, would you say it kind of opens up some space to carve out a new path, or insert new information into that simulation or the concept or the behavior?

Larry Barsalou ([00:45:18](#)): Absolutely. It essentially disengages you from that course of situated action, the situated action cycle that you were imagining, and it gives you the opportunity to create a new one, where you could do something differently.

Wendy Hasenkamp ([00:45:35](#)): That's really powerful.

Larry Barsalou ([00:45:36](#)): Indeed, it is. And then I think you're now in a position where the new thing you create might have some chance of actually succeeding, because you've been able to disable the old habit, the old way of thinking.

Wendy Hasenkamp ([00:45:49](#)): Right. And you're also able to bring some intention into what you're putting into the system now, making smarter choices, hopefully. And also the role of stress, as you

mentioned—is there evidence that in stressful situations you're more likely to revert to old habits? It feels like the space we were just talking about, that can arise from a mindful perspective, is just totally missing in a stressful situation. It's almost like it's kind of eating up any extra bandwidth that you have.

Larry Barsalou (00:46:26): Yeah, no, I'm sure what you say is correct. That when you're really stressed out it's because you are mentally transporting yourself into this situation. You have all these affordances, you're trying to figure out how to deal with them. All your mental capacity is going to thinking about... to experiencing the situation and then figuring out how to deal with it. And so yeah, you just don't have the same amount of capacity you would have as if you were able to dismiss, to deconstruct that thought.

Wendy Hasenkamp (00:46:55): Right. So this is really an interesting way of looking at the benefits of mindfulness for potentially changing habits or thought patterns.

(00:47:24) – *musical interlude* –

Wendy Hasenkamp (00:47:24): So what you've described you've been referring to as the situated action cycle, and I'd like to talk a little bit more about that word "situated" because a lot of your work has shown how important a given situation is to the way our minds process it. So, can you say a little bit about the importance of situatedness for the way our minds work?

Larry Barsalou (00:47:51): Yeah. So when I first got into the grounded cognition thing, my primary interest was in simulation. I was just totally captured by this idea that the brain could represent concepts and inference with reenactments of experience. But in more recent years, my interest has shifted. I mean, simulation is still great and it's really important, but I'm really interested in situations. I think it's all about situations. And into a large extent it's because of the situated action cycle—our brains are basically built to implement the situated action cycle. And this is what we do all the time.

Wendy Hasenkamp (00:48:33): Does it mean that we don't act or think so much generically, or in any kind of average way, but all of our thoughts are—I guess this is part of the groundedness, right—in the situation. So it's like uniqueness.

Larry Barsalou (00:48:52): Yeah. In part, my interest in the situated action cycle is a reaction to the practice of cognitive psychology and cognitive science, which is where I came from essentially, to study cognition extracted out of situational activity. Separated from emotion, separated from action, separated largely from reward, and certainly not coupled with actual physical situations. The idea is that we can just study cognitive mechanisms in the lab, in this isolated module. And I just think that this is really a misguided approach.

Wendy Hasenkamp (00:49:32): So that's how cognitive science has generally been done, is in the lab, in some abstract scenario?

Larry Barsalou (00:49:38): Focusing on cognition, leaving out action, leaving out emotion. And I guess I'm just increasingly convinced that the whole purpose of cognition is to support action. Ultimately it's action that ensures our survival, the survival of our species, achieving our goals. And just to sit there and cognize without action would not be terribly useful—the reason we cognize so much is so that we can perform effective action. So that's why I'm so interested in situated action cycle. I really don't want to

study cognitive mechanisms in isolation anymore. I want to study, if I am studying something cognitive, I want to look at it in the larger context in which it operates.

Wendy Hasenkamp (00:50:24): So what kind of implications does that have for the way you conduct your research?

Larry Barsalou (00:50:29): That's one reason I really like studying health behaviors. Because all of the phases of the situated action cycle are critical. You certainly have concepts and cognition, and they're absolutely central, but they're tied in with emotion and motivation, tied in with action, outcomes. And getting back to your original question about situated and situations. I mean, I'm just increasingly convinced that it's essential to actually study the situated action cycle in the actual situations where it's performed—either physical situations or the social situations—and that you have to take those into account.

Wendy Hasenkamp (00:51:05): So how can you do that? How can you study things in the lab in a rigorous way, but also in the context of a situation?

Larry Barsalou (00:51:12): That's a great question. And I think maybe it requires doing different kinds of work. I'm still trying to figure this out. We have this new method for measuring health behaviors called the situated assessment method, and it naturally can incorporate measures of the environment, of external situations, into it. But it's more of like an individual difference measure rather than an experimental technique for doing standard experimental psychology. One of the beauties of the lab is you have all this control, but you take people out of situations. And to actually put people back in the world, then you lose all the control in the lab.

Wendy Hasenkamp (00:51:54): Exactly. That's where I was going, is it seems true that behaviors and cognition are going to be very dependent on the situation. But if we want to really raise that up, and emphasize all of these unique outcomes per situation, to me that raises a lot of problems for doing science, and trying to be able to generalize any outcomes. So yeah, how do you make sense of that?

Larry Barsalou (00:52:20): I mean, actually in language, for example, a tremendous amount of work has studied language by simply presenting words or phrases or sentences on a computer screen, and looking at a variety of responses that people make to those. And Mike Tanenhaus invented something called the Visual World Paradigm that revolutionized the study of language. He had people processing language, but with respect to an actual visual world that was on a table in front of them. And when he actually studied language in the context of an actual situation, he got really different results than people had when they didn't have a physical situation. So this is like an existence proof, that it's possible to do good experimental psychology by bringing situations more to bear. And I think the work on the Visual World Paradigm is a great example.

(00:53:12) Other ways of doing this that we've actually been doing, that Christy Wilson [Mendenhall] and Lisa Feldman Barrett and I did in our studies of emotion, we developed these rich, textual descriptions of emotional scenarios. So that when people read these scenarios, and if they immerse themselves in them, and they experience the affordances, and they feel like they're in the situation. And then we can study various kinds of cognitive mechanisms that might be of interest. But we have them situated by using language to put them in a situation before we study a cognitive mechanism.

Wendy Hasenkamp (00:53:47): Right. So you've done some work—this seems to have a lot of implications for a lot of standard questionnaires that are used, for example, in psychology research. In the case of the contemplative science world, measures of mindfulness are actually quite debated, how valid they are, how relevant. So you've done some work comparing the most commonly used measure of mindfulness, which is a questionnaire that is in this more abstract, generalized form, right? So questions, um...

Larry Barsalou (00:54:21): Like, how much are you able to pay attention to the things that are happening around you? How judgmental are you about yourself in various situations? How much do you react negatively when things aren't going well?

Wendy Hasenkamp (00:54:37): Right. So those kinds of questions seem to aggregate over all given situations, right? They're just kind of, on average, how judgmental are you, or things like that. So your work would suggest that this is actually not an accurate way to measure behavior, because it's going to be dependent on the given situation.

Larry Barsalou (00:54:56): Yeah. I wouldn't necessarily say that these standard instruments are not accurate. But what we're finding is they produce different measures of an individual's mindfulness than measures that are situated. So, like in the Five Facet Mindfulness Questionnaire (FFMQ), it attempts to measure people's awareness, their reactivity, their judgmentalness, using very abstract questions that don't mention specific situations. That just ask people generally across situations, how judgmental are you, how aware are you?

Wendy Hasenkamp (00:55:27): Can you say a little bit about the work that you've been doing to try to develop an alternative way to measure these things?

Larry Barsalou (00:55:34): What we've done is we give people actual situations—like failing an exam at university, or your car breaking down on the highway—and then we ask them how aware are you of what's happening? How judgmental, how reactive are you? How well are you able to describe what's happening? And when we measure the five facets of the Five Facet Mindfulness scale in that situated manner, we get very different individual measurements than one would with the Five Facet Mindfulness Questionnaire. So what this suggests is that being situated, essentially people see themselves very differently than when they're not situated. I mean, both of those measures could be useful, but in different ways. And something that we need to work on in the future is to figure out what each of them predicts.

Wendy Hasenkamp (00:56:29): Right. It seems like maybe the more abstract questions... would that generate more of an answer that's kind of your own perception of how you might be? Whereas that's not as directly related to how you might behave in any given situation.

Larry Barsalou (00:56:44): Yeah. I think that's a good possibility, that the more general instruments like the FFMQ are capturing, to a significant extent, people's intuitive theories about themselves. Certainly those theories may be grounded in actual situations to some extent, but they may be influenced by other factors as well. Whereas when you assess mindfulness in this situated manner, you may be getting assessments of the various facets that are much closer to what actually happens in specific situations. There's a large literature on attitudes, which shows that if you measure a person's attitude toward something generally, it doesn't do a very good job of predicting their behavior. But if you measure their attitude in a specific situation, that's going to do a much better job of predicting their behavior there.

And we think it's the same thing might be true for this situated measurement—that it may indeed give us more accurate assessments of people's mindfulness in actual situations. But that remains to be seen.

Wendy Hasenkamp (00:57:46): Sure. That's making me think of... when we start to think about our ideas of how we might behave, and that not necessarily lining up with our real behaviors, comes into all sorts of things about identity and self-concept. How does that play into the situated action cycle, these beliefs that we hold about ourselves? And does that come in with the self-relevance piece or...

Larry Barsalou (00:58:10): Yeah, I think one thing that humans do that no other species do is to develop a concept of ourselves. I once asked Mike Tomasello if he thought other primates did this, and he said definitely not.

Wendy Hasenkamp (00:58:22): That does seem to be quite relevant, or quite different for us.

Larry Barsalou (00:58:25): I think other species do have an implicit sense of who they are—their body, their smell, their action. But I think humans can develop a concept of who they are. And it would be the kind of concept that we were talking about earlier. (And I'll tie to the situated action cycle in a second as I think all concepts are tied to the situated action cycle.) But these concepts of ourselves, we can draw on anything in our experience, virtually. We can draw on what our bodies are like, that becomes part of who we are. We draw on the social groups we belong to. We draw on the artifacts we own, the kind of... whether we use an iPhone or an Android, whether we live in the Midwest or on one of the coasts. All of our actions, our emotions, the outcomes we achieve with our actions, all these things we are able to integrate into a concept of who we are. And I think especially important is various kinds of ideas about ourselves that we get from the groups we belong to—about goals that we should have, values we should have, ways we should treat other people, things that we think are politically important to see occur in the world.

(00:59:43) And all of this becomes part of our identity. And I think the really amazing thing about humans is that once they've got this identity, they can use it to drive the situated action cycle. So basically now it goes down into that self-relevance thing we talked about earlier. And when things happen in the world, it gets filtered through your self-concept, and you now start wanting to generate action that supports your self-concept.

(01:00:07) And we're the only species who does anything like this. All other species, their situated action cycle is largely being driven by biologically given drives, and other sorts of goal setting that they have. They can't create some concept of themselves that goes way beyond these biological drives, and then organize their action around. So I think it's really significant evolutionarily that we're able to develop these concepts of ourselves that then can take over control of the situated action cycle.

Wendy Hasenkamp (01:00:42): And so do you think that our self-concepts can also be changed, in the same ways that we were talking about changing habits? Is it the same process to potentially shift or expand our self-concept?

Larry Barsalou (01:00:56): Yeah, I mean, I think that's a really interesting question. And I think sort of the contemplative approach has some interesting things to say about this. So one thing that certain contemplative approaches aim to do is for you become more aware of your self-concept, and to realize that it is just a concept. Because the classic Buddhist thing is to come to believe—just like we talked about subjective realism and mental time-travel—Buddhists argue that we come to see these self-

concepts as real things, that this is really us, this is who we are, this is our person. Which in a way is an illusion, because our person is a lot of other things beside that. But we come to identify so strongly with these concepts, that that's who we think we are.

(01:01:43) And I think the contemplative practices try to make us aware that these are just concepts. That in a way they could be totally empty or meaningless, in the sense that they aren't real, they're just constructions. And just as we talked earlier about, if you can change your perspective on a thought from seeing it as a real event to just seeing it as a thought, it no longer has the control over your behavior, you can just sort of drop it and move on to something else. And I think the same thing might be possible with self-concepts. That might be one way if you wanted to change your self-concept, to see that your current self concept is just a construction and say, "Well, I'm not going to let that run my life anymore. I'll construct something else." Or you could just maybe try to decide to live without a self-concept. And it's an interesting question then, what controls your behavior under those circumstances, where you no longer think that you have a self that's driving everything?

Wendy Hasenkamp (01:02:39): Right. Do you feel like your own self-concept has shifted since encountering all of this work?

Larry Barsalou (01:02:46): Oh yeah, for sure. Yeah.

Wendy Hasenkamp (01:02:48): How so?

Larry Barsalou (01:02:50): Hmmm. I mean, I think I'm more likely to see it as a construction, and to be less inclined to let it run my life. Even though I certainly have moments and periods where it does—where some sort of idea about myself becomes very important and I really work hard to defend it and look out for it. But I would say I increasingly either see the illusion of that, or I don't have a strong sense of that construct controlling my action as much as it used to.

Wendy Hasenkamp (01:03:21): That sounds very freeing.

Larry Barsalou (01:03:24): Yeah, I guess so...

Wendy Hasenkamp (01:03:27): Or possibly destabilizing? *[laughter]*

Larry Barsalou (01:03:31): I don't know. I just feel... I think I feel more relaxed and open and flowing in a sense. Because I think the standard line is that once you let go of that construct, your behavior is more controlled by your conditioning. And in fact, this I think is another major tenet of Buddhism, that you really shouldn't proceed to the practices that involve deconstructing yourself until you've conditioned yourself to be a responsible, good person.

Wendy Hasenkamp (01:03:59): To implement the ethical behaviors... Makes a lot of sense.

Larry Barsalou (01:04:02): Yeah. So that's why all the ethical practices come first, such that once you no longer have that thing running your life, you just kind of let all that hard conditioning you've done take over, and you just go on cruise control while it runs the show.

Wendy Hasenkamp (01:04:19): Right. So you have a new solid foundation that's then taking over. It's fascinating. So how did you get interested in studying the mind and concepts and grounded cognition?

Larry Barsalou (01:04:33): I was a child of the '60s in California. Need I say more? *[laughter]* Yeah, I mean I grew up in California during that period and there was a lot of interest in self-examination and openness. And I read, I think pretty much all of Alan Watts's books, which had a huge influence on me. I dropped out of college for five years, while I was sort of trying to find myself—you know, sort of a '60s thing to do. And I decided at that point that I was a Buddhist, and I became extremely interested in how the mind works, I think simply because it was sort of in the air at the time. And I think the Watts books had a huge impact on me. And at some point I decided to go back to college and at that point I knew I wanted to do psychology. I was really interested in the mind. At that point I wanted to do clinical psychology, but I really didn't know about other forms of psychology.

(01:05:35) But I went back to UCSD, which had an amazing group of faculty at the time, an amazing undergraduate psychology degree. And immediately I was immersed in absolutely wonderful courses from the scientific experimental perspective, and I fell in love with it. It just seemed so right and so natural, that I sort of dropped the interest in being a clinician and started getting into the science. And I was incredibly fortunate, and it's just all luck. I mean, I got pulled into these amazing labs and had these amazing opportunities to work with people like Don Norman, Dave Rumelhart, George Mandler, take courses from people like Jay McClelland, Elissa Newport. Yeah, so I just became a cognitive psychologist at that point.

(01:06:24) And it's interesting now, that I'm actually much more interested—and I have been for some time, going back to the stuff on stress—in the clinical side of things. And all the health behaviors would be more related to that.

Wendy Hasenkamp (01:06:35): Right, clinical interests coming back in.

Larry Barsalou (01:06:36): Yeah, so I think that's good. And I never... even though I decided I was a Buddhist at 17, I'd really never practiced, until Susan Bauer-Wu invited me to collaborate with her on a project and I got to know all the Buddhists at Emory. And at that point decided to start practicing more. I had actually taken an MBSR course a little bit before that, and I'd actually sort of quickly migrated from doing the more object-based breath practice to more of an open presence practice. And I was quite puzzled by the fact that that was just such a natural move for me, and actually I liked the open presence practice much better than the breath practice. And I started asking people like John [Dunne], "Is there something wrong with me? And what is this thing I'm doing?" And he immediately said, "Oh yeah, that's okay. That's fine. You're doing Mahamudra Dzogchen." And I said, "What's that?" And he started feeding me books. *[laughter]*

Wendy Hasenkamp (01:07:40): Ha! You ask John Dunne about Mahamudra and Dzogchen, yeah...

Larry Barsalou (01:07:43): Yeah. And he started introducing me to teachers, and letting me know about retreats and things. So that's when I got really interested in Buddhism and started doing contemplative science work.

Wendy Hasenkamp (01:07:54): Great. Yeah, so then you were kind of able to weave in Buddhist practices or philosophy into some of your research.

Larry Barsalou (01:08:02): Yeah. Yeah, no, it was very weird for a while, being a very serious practitioner and then trying to do science on it at the same time. It felt a little bit... I don't know. There were too

many different perspectives going on, and I wasn't quite sure where I was. But actually it now seems very natural and easy.

Wendy Hasenkamp ([01:08:21](#)): Yeah, the field has changed a lot. It seems like in the earlier days that was a hard thing... those two things were very difficult to bring together in a rigorous way. But it seems like we're getting there.

Larry Barsalou ([01:08:34](#)): And I think the SRI is a great venue for making people comfortable for doing both. And it certainly was for me. When I first came to my first SRI it was, I think, really helpful in sorting out, in putting together, practicing personally, but also wanting to study this scientifically. And just seeing a lot of other people doing, it and seeing how they were doing it was extremely helpful.

Wendy Hasenkamp ([01:09:01](#)): Well, thank you so much for spending your time with us today. It's been really wonderful talking with you.

Larry Barsalou ([01:09:06](#)): Oh, thank you so much. It's been a pleasure for me as well.

Outro – Wendy Hasenkamp ([01:09:15](#)): *This episode was edited and produced by me and Phil Walker. Music on the show is from Blue Dot Sessions and Universal. Show notes and resources for this and other episodes can be found at podcast.mindandlife.org. If you enjoyed this episode, please rate and review us on iTunes, and share it with a friend. If something in this conversation sparked insight for you, we'd love to know about it. You can send an email or a voice memo to podcast@mindandlife.org. Mind & Life is a production of the Mind & Life Institute. Visit us at mindandlife.org, where you can learn more about how we bridge science and contemplative wisdom to foster insight and inspire action towards flourishing. There you can also support our work, including this podcast.*