

On Intuition

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December 8, 1998

I have come up with a theory about “intuition” which I describe here.

First, let me say that whenever we think about something, we actually perform two tasks simultaneously. One, we think about the thing itself and, two, we think about our own thought processes. That is, we introspect as we are thinking. For example, as you cook dinner, you are thinking about cleaning the vegetables and how soon the meat needs to come out of the oven. But as you cook, you also are monitoring and watching your own thoughts. You might think, “I better not forget to stir the sauce; Keep mentally repeating don’t-forget-to-stir-the-sauce” or “I need to start planning how to put it all on the table” or “I must commit this recipe to memory; to do this I’ll force my mind to run through the ingredients again.”

There are two processes going on in your brain. One part of your mind is *thinking about X* (the task at hand) while the second part is *thinking about thinking about X*. I call the second part the “executive” part. It is overseeing the process and making sure that the appropriate mental resources are allocated to the subtasks as needed. I believe that it is this executive task that is associated with one meaning of “consciousness.”

Occasionally, you might do something without being fully conscious, without really thinking about it. Perhaps you play a musical instrument. While you are performing, your mind is so busy with the main task (X) that you have nothing left over in your brain to think “executive” thoughts. For me, sex is like this. I might say my mind shuts down, but obviously it doesn’t fully shut down. I am still thinking about (and enjoying!) the physical feelings and the emotional feelings, but I am no longer thinking about the fact that I am enjoying it. All of my brain seems to be wrapped up in the main task, and to some extent, it feels like a little loss of consciousness.

This executive ability is just the ability to reason about reasoning, to think about thinking. We have lots of different mental abilities in our brains. We can think about controlling our bodies. We can think about mathematics. We can think about language and

reading. We can think about playing the piano, and so on. We can often do several things at once. For example, we can drive and talk at the same time, since different parts of our minds are involved in those rather different tasks. But we can't really read while listening at the same time to an interesting conversation since some of the same parts of the brain are involved. We can use the language mechanisms for only one thing at a time.

The ability to think about thinking is just one of the many capabilities of our brains. Not only can we do a task, but we can also watch our minds at work and then later explain to another person the thought process we used. This separates us from chimpanzees. We can see how we think; we can tell other people how we think or how to think; and we can control and change how we think. For example, a parent can explain to a child the best way to think about some problem the child has.

When we can watch our own thoughts and can then explain them later, we feel that we have understood the process. It is not intuitive. When we do some task, or figure something out, but cannot explain how our minds did it, we sometimes call it "intuitive."

Ants and bees and wolves are social creatures. They form groups with social structures. The individuals have to communicate and relate to the other individuals. The individuals and their places in the group may change frequently, but the basic social organization itself does not change. (It changes only slowly, over evolutionary time.) There is constant competition to be the new alpha male, but the wolf pack will never decide to adopt a more democratic, egalitarian organization!

We humans are a social species, and social with a vengeance. With humans, the structures themselves are changing. We humans love to create new complex social structures. For example, humans have built tribes, religions, political systems, corporations, reading groups, fashion fads, rules of subway etiquette, and all sorts of structures of social behavior. Social scientists and anthropologists will never be out of work if all they do is describe human social structures.

We humans also like to come together in large groups. Wolf packs and bee hives have the same number of individuals, more or less, from year to year. If too many individuals are born, the hive or pack will split up to restore the right number. But we humans, have not yet found the right size. We are currently organizing everyone on the planet into a global social system, a uniform world-wide culture. We seem to want to include more and more people

into this growing social order. For example, to help with the unification of world culture, we seem to be reducing the number of distinct languages and dialects. The economic system is being standardized and Europe is moving to a single currency. A vast telecommunications net is being built, so everyone can communicate with everyone. We are creating international legal codes. We have made it possible to fly from Indianapolis to Bangkok, walk into a hotel room and not be able feel out of place. And the number of people on the planet involved in this enterprise is constantly growing. How will this trend play out in the future? Will the social organizations increase in complexity, placing an even greater premium on the ability of individuals to cope with society and with other humans?

Given that we are a very social species, it is especially important that we be able to understand other people. To live in this social world, we must know how to interact with other people. To survive and thrive, we must be good at understanding, communicating with, out-guessing, and even manipulating other human beings.

In order to think about anything, we must create a model in our mind of the thing we want to think about. This is true both for thinking about simple things and about other people.

As an example of thinking about simple things, I have a model in my mind of how my city streets are laid out. Of course this mental map is incomplete and inaccurate, but I can still use it to reason about getting around. I can think, “The fastest way to get from such-and-such a place to some other location is to go by this street, since the freeway is likely to be crowded at this hour.” In order to think about anything, we must carry in our minds a representation of it and we must have learned how to think about it. I have learned a few rules for thinking about driving and getting around town.

You might be able to get by without driving, but you certainly cannot get by without dealing with other people. We have developed an enormous mental machinery to think about other people and their possible actions. Thoughts like, “If I tell him this, he is likely to get mad” or “He said he was away on business, but I saw him in a local restaurant... he must have been lying... he must be having an affair with another woman.” These trains of thought are often very complicated yet have an amazing ability to imagine and reason about what other people are thinking.

In a social species like humans, there is an enormous survival advantage to being able to predict what other individuals are thinking or what they will do next. We are always competing with each other, and the ability to understand your fellows would be a survival boon to any human. The most successful humans today understand and relate to other humans exceptionally well. Some humans can understand and alter the thought processes of other humans, getting them to carry out the garbage when they really don't want to, or getting them to stand idle while being passed up on the corporate ladder. The people that can't relate to other humans become street-people, criminals, hermits, or possibly engineers.

Perhaps the evolution of human thought began with a crude ability to assess only the emotional state of other humans. A chimpanzee can, for example, understand that another chimp is angry, even though he is not angry himself. He can then take appropriate action. On the other hand, rats have emotions but probably do not possess the ability to model the emotions of other creatures. Perhaps early humans first began with very crude models of other individuals. As time went on, the ability to "think about thinking" got better and better, until we humans developed the ability to maintain and reason with elaborate mental models of other humans.

Once developed, this mental machinery could then have turned inward. If you can think about how Joe thinks, you can also think about how you, yourself, think. Of course, thinking about your own thoughts is very different from thinking about how other people think. For one thing, you have a whole lot more information about your own mental state. Most people know what emotion they are currently experiencing, even if they have not been taught to name it or alter it, while you don't always know the emotional state of another person. For another thing, you get the data about yourself directly from one part of the brain to another, while you get data about other people from external physical clues, such as facial expressions. Nevertheless, many of the same kinds of mental pathways are used for both sorts of tasks.

Perhaps we humans evolved this ability to think about what other people were thinking first, before we developed our ability to think about what we are thinking ourselves, or perhaps the other way around, or perhaps these two abilities evolved in parallel. After humans developed the ability to reason about other humans, they might have slowly evolved the capability to apply this sort of reasoning to their own minds. Or perhaps humans first developed the ability to introspect and control their own thoughts first, then later they evolved to ability to apply that mental machinery to thinking about other humans. There is

obviously great survival value in being able to control and regulate your own thoughts but there is also great survival value in being able to guess what other people are thinking. It is hard to know whether one skill came first and led to the other, or whether they both evolved in parallel.

So here is my theory about human “intuition.” Intuition is simply knowledge gained by thinking about thinking. Normally, intuition is associated with knowing what is going on within other people. We might say, “I knew Joe would do such-and-such. I don’t know why I knew it... just intuition.” To understand Joe and his thoughts and possible actions, we had to think about Joe’s thinking. To do so required all the mental machinery we have that would otherwise have been used to think about our own thoughts. We built a mental model of Joe and tried to guess what he could have been thinking. This is such an enormous task, that while doing it, we were completely unable to introspect on our own thoughts. We were unable to watch our own thoughts, since we were using that ability to “watch” Joe’s thoughts instead.

After we came up with our conclusion that “Joe will probably do such-and-such” we were more-or-less unable to explain our line of reasoning. Normally, as we think through a task, we make little notes and remember the overall steps. In response to the question, “Why didn’t you take the freeway?” I might respond, “Because I thought it might be crowded, since I knew the game at the stadium just ended.” You would laugh if my answer had been “just intuition” and you would ask again. You expect me to have been observing my own train of thought in at least some small degree. And I did, since thinking about driving and thinking about thinking are very different tasks and can be done simultaneously.

We often cite “intuition” whenever we have an inability to explain the particular train of thought we followed. The inability can occur because the sequence of reasoning involved thinking about someone else’s thought processes. The act of thinking about Joe’s thoughts momentarily subverted or compromised that portion of our brain that is able to analyze our own thoughts. When we think about someone else’s thoughts, we lose our ability to think about our own thoughts. The result is that we fail to lay down memories about what our own brain was doing. When looking back later, any conclusions or ideas we had simply seem to have come out of our minds with no explanation. We might remember a little bit—that we were thinking about Joe and we might vaguely recall thinking about some aspect of Joe’s behavior, but we really don’t remember in any detail exactly how we arrived

at our conclusions or beliefs about Joe and his thoughts. Our memory of what occurred in our own heads is incomplete and sketchy.

The term “intuition” is occasionally applied to other domains. For example, the human vision system takes up about a third of your brain but is almost completely closed to introspection. The “executive” simply cannot control or observe what is happening in that part of your brain. For example, when you look at a friend’s face and recognize him, you use an enormous amount of your brain. Occasionally, when it is dark and the person is far away, it can take several seconds of looking right at the person before you suddenly realize that you recognize your friend’s face. That is a lot of mental effort being expended!

If someone asks how you recognized your friend’s face, you really have to say, “I don’t know. I just knew.” You have no ability to introspect on the task of facial recognition. In a way, it feels like intuition, but it is a little different. The similarity is that you are trying to describe a mental process about which you have incomplete information. One difference is that you are almost totally blind to what is happening in the visual cortex part of your brain while you can see (at least in some degree) the working of other parts of your mind. Another subtle difference is that in one case the ignorance is about one thing (vision) and in the other case the ignorance is about something quite different (thoughts about thoughts). We feel or sense these two forms of ignorance very differently and, by custom, we use the term “intuition” only for the latter form of ignorance.

People’s minds are very complex and we really don’t have a very good idea of what is going on in anybody else’s head. Joe’s brain is roughly as complex as your own. Maybe he is a little smarter or maybe you are, but both brains have about the same degree of complexity. You use your brain primarily for thinking your own thoughts. You have a lot more to think about and remember than just worrying about Joe. Thoughts about Joe can therefore take only a very small part of you mental capacity.

Joe, on the other hand, is using a full brain to think his thoughts. He spends all day, every day thinking his thoughts. If you really wish to understand Joe, you would need to put a whole lot of effort into imagining what might be going on in his head. In other words, to really understand Joe, you would need to think his thoughts. This task takes his entire time, but you can only devote a small amount of your time to thinking about him. And to compound the situation, you have very limited information about what he knows and what has happened to him. He has perfect knowledge of his memories, while you have very

sketchy information about what he knows. He also knows what is happening to him—his sensations and so on—while you know almost nothing about what Joe is experiencing.

The result is that, in order to do a decent job of guessing what is going on in his head, you will need to devote as much of your mental resources to contemplating his thoughts as you possibly can. When you do this, your brain will be filled with a *simulation* of his brain, with very little left over to think about anything else. In other words, you will allow your brain to temporarily think Joe's thoughts (or at least an approximation to them). You might be thinking things like, "Well, he knows this, so he would probably think of trying that" or "I know he is feeling angry; how would that change his thoughts?" and so on.

The mental capabilities you really need to devote to thinking about Joe's mind are the capabilities you would normally use to think about your own thinking. In other words, you are very busy *thinking about thinking*, only it is Joe's thoughts and not your own that you are busy with. As a result, you will have very few mental resources left to think about your own thinking. This is why when you are trying to understand some very complex behavior in another person, or trying to understand the feelings or guess the future decisions of another person, you will probably not be able to recall or justify or explain how you arrived at your conclusion. You will not have a high degree of consciousness while you are pondering Joe's mental states. The word we use to explain our lack of self-understanding in such cases is "intuition." How did you guess what Joe would do? "I don't know... intuition I suppose."

Intuition also occurs in other forms of complex reasoning. Mathematicians often cite intuition when they are asked how they knew certain difficult facts or how they guessed at some answer or came up with some complex theory. When they perform these difficult feats of reasoning, they are using a larger part of their brain than normal. To use a computer analogy, they are devoting all their CPU time to one task, leaving nothing for the other tasks. The mathematician momentarily goes through a period of diminished consciousness while he goes through some particularly difficult mental gyrations. It is well known that such feats of creativity require heightened concentration; there is no room for other distracting thoughts at the same time. Later, the mathematician simply reports that he "knew from intuition."

The intuition experienced by a mathematician as he concentrates on an abstract math theorem might be slightly different in flavor from the intuition about Joe's behaviors and

thoughts, but is still more or less the same thing. In both cases, the brain was so thoroughly engrossed with its task that the normal executive oversight, whereby the brain observes its own processing, is temporarily suspended. Later, it is difficult to reconstruct what went on in your mind. In both cases, a small loss of full consciousness occurred.

In contrast, a state of high consciousness might occur when your eyes are closed and your brain is at rest. You are not very aware of your surroundings. Nothing is pressing in on your mind. Your emotional state is relaxed and alert and you are free to think solely about your own thoughts. Your mind turns inward and you begin to watch your own mind at work. Perhaps your mind turns to think about something simple. Meanwhile, another part of your brain sits back and watches the first part as it thinks. In extreme cases, I sometimes feel like my brain splits into two pieces. One thinks and the other sits back and observes the thinking. Sometimes, the executive process will butt in and redirect the thoughts in the other half. Perhaps this division is a right-brain, left-brain division, with one hemisphere thinking about the something and the other acting as the executive, but I don't know if this is true. In any case, heightened consciousness occurs when you are free to think about your own thoughts, when all your attention is on your own mind.