



## Wondering about mindfulness, mind-wandering, and consciousness: Interview with Jonathan Schooler

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Tipo de artículo: Entrevistas, Multilingüe.

Disciplinas: Psicología, Filosofía.

Etiquetas: mindfulness, consciencia plena, meditación, mind-wandering, divagación mental, consciencia, educación, carrera científica.

*Jonathan Schooler is Distinguished Professor of Psychological and Brain Sciences at the University of California Santa Barbara. Author of more than 200 scientific articles, his research covers a wide range of disciplines including psychology, philosophy, and meta-science. In this interview, I talk with Dr. Schooler about some currently highly active research areas that he and his team are contributing to move forward, from mindfulness and how to apply it in the classroom, to mind-wandering and its multiple facets, to consciousness and the development of an emergent theory to explain it. The interview closes with Dr. Schooler offering advice to starting researchers aiming to launch their scientific career.*



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Question – There has been an explosion of mindfulness research in recent years. Your lab has also become strongly interested in the science of mindfulness, and you even teach a course on this topic at UC Santa Barbara. How would you define what mindfulness is?

Answer – There's a lot of definitions of mindfulness out there. For me, the number one most important feature of mindfulness is having one's attention grounded in the present, so one is aware of what's going on around them and in their mind. There are additional elements that are oftentimes integrated into the definition, which include a non-judgmental perspective on the thoughts that go through one's head. This implies neither immediately accepting nor rejecting them; simply noting them. One of my favourite bumper stickers that I think captures this notion is "Don't believe everything you think". Of course, both of these qualities, the grounding in the present and the non-judgmental perspective, oftentimes involve a practice of meditation, where you essentially find an

anchor, such as the breath, and then try to hold your attention to that anchor. When thoughts arise, you simply release them without judgement and return to the anchor.

Q – Your team has recently established the Center for Mindfulness and Human Potential (<https://www.cmhp.ucsb.edu>), a research institute devoted to the practical application of mindfulness in educational settings. What are the main aims of this center? Have you gotten any interesting results so far?

A – The main aim is to promote human potential by cultivating mindfulness. The primary place in which we have been addressing this goal currently is in the high schools. We have developed an app called Finding Focus, which introduces students to the basic idea that they are in control of their attention, that focus is something that you can cultivate. The basic program, which takes about two weeks to go through, involves a set of brief but precise instructions on how to manage one's attention, drawing on basic concepts such as finding an anchor and learning to hold the focus on it; and includes practice activities that involve what we called “daily beats”, where participants listen to music as a ground for their meditation. And, yes, we have gotten some very exciting results so far! We've looked at pre-post changes in measures such as mind-wandering, which is a big interest of research in my lab, stress management, self-control, life satisfaction, among other. In all these different self-report measures, participants showed marked improvement after the intervention. So we're really excited that this program, which can be done entirely online on a computer, cell phone, or tablet, can hold the promise of introducing anyone who's interested, but particularly high school students, to the powers of mindfulness.

Q – You have mentioned mind-wandering, which is a topic you have devoted a great deal of attention to and perhaps the one you are best known for (e.g., Smallwood & Schooler, 2015). Could you tell us what mind-wandering is?

A – My favorite example of mind-wandering is when you're reading and, suddenly, you realize that your eyes have been moving across the page, but your mind has been completely elsewhere. It's when the mind leaves the here and now, and wanders off to thoughts unrelated to what's going on. So, in many ways, it's the opposite of mindfulness. The fact that mind-wandering and mindfulness are sort of on opposite ends of a continuum is one of the things that brought me into becoming interested in mindfulness in the first place.

Q – Interestingly, however, in the last few years it is becoming increasingly acknowledged that neither mind-wandering is a unitary cognitive process, nor all types of mind-wandering need to be detrimental. This is related to what you have sometimes referred to as “mind-wondering”. Can you tell us a bit more about this?

A – You're exactly right. I already mentioned that mind-wandering can impair primary task performance, and other research indicates that when people are mind-wandering, they're less happy than when they're on task. But, as you noted, we have found that not all mind-wandering is created equal. So for example, in one study, we found that even though, overall, people who were mind-wandering were less happy than people who were on task, when people were mind-wandering about material that they were especially interested in, they were actually happier than when they were on task. So it's not that mind-wandering, per se, is a cause of unhappiness; it's that certain topics of mind-wandering are. Additional research has looked at the relationship between mind-wandering and creativity. In one study, we found that approximately 15% of the ideas of creative writers and physicists happened when they were doing something outside of work, and not even thinking about it. These ideas were as creative as the ideas that they had when they were at work, but were more likely to involve overcoming an impasse. In additional research, we've looked at a particular kind of curious mind-wandering, where people are specifically thinking about problems that they've yet to reach a solution for. We found that creative individuals are notably more likely to engage in this curious kind of mind-wandering, which we also refer to as “mind-wondering”. So we think that there may be a particular kind of mind-wandering, where you're thinking about something that you're interested in, that you're curious about, that engages your thinking in a constructive way and may be very helpful for creative advances.

Q – Both mindfulness and mind-wandering touch upon the broader concept of consciousness, which is in itself other of your main research interest. Indeed, your team is currently developing a novel theory of consciousness, the General Resonance Theory (Hunt & Schooler, 2019). Could you tell us in simple words—if that is possible—what consciousness is?

A – People oftentimes say that consciousness is impossible to define. But I actually think that consciousness may be the only thing that we can refer to with absolute clarity. Consciousness is simply what it is like to be you, while you are awake. From the moment you wake up in the morning, until the moment you fall asleep at night, there is an ongoing active experience—and that's consciousness. It's the only thing that we truly know, everything else is an inference.

Q – How does the General Resonance Theory explain consciousness?

A – We have a paper which is called “The easy part of the hard problem”, a name which pays homage to David Chalmers' observation of a very difficult problem in science, quite possibly the most difficult one, which is understanding how this three pound meatloaf of a brain can produce subjective experience. We don't have an explanation for that, but there are a number of different philosophical stances of addressing this problem. One of them is the notion of something called panpsychism. Panpsychism is the premise that consciousness is an intrinsic aspect of physical reality, that there's a little iota of consciousness in everything, from the level of elementary particles. Now, the perennial problem with panpsychism is something known as the binding problem, which posits the question—how do those bits of consciousness bind into the wider consciousness that we experience?

That's what we're referring to as the easy part of the problem, in that there does seem to be a possible way in which that could take place: Through resonance. The key idea is what we call “nested observer windows”, which postulates that little bits of consciousness are resonating with and observed by larger windows, which in turn synchronize with and are observed by larger windows, and so on, and that can thereby allow for conscious experience with the level of complexity that we have. The metaphor that I quite like is that of the mosaic pictures where every pixel is itself a picture. And so you have paintings that are the foundation for larger paintings, and the smaller pixels are themselves a collection of yet smaller pixels.

Q – I find it really compelling to conceptualize consciousness this way, but, of course, it is also difficult to test these claims. I think you have in mind some proposals for testing the theory, could you tell us a bit more about that?

A – In a certain level it's impossible to test, there's always a bit of conjecture that is required for inferring consciousness. How do I know that a dog is conscious? Or do I know, can I know? I can't know. But I genuinely think that a dog is conscious, because it has enough of the characteristics that I need to begin to infer it. So in the same way that we begin to infer the consciousness of animals, we can begin to infer consciousness at different levels of information integration in the brain and see whether or not it operates in the same way at each level, or if something remarkably different happens at a particular level. For example, there's a notion in consciousness research known as the global workspace, which is the idea that different brain's information processing streams all get integrated into a singular experience. If consciousness is only emergent at that global workspace level, then the information integration processes that you see at this level should be fundamentally different from those that you see at lower levels. In contrast, if as we speculate, its windows upon windows upon windows, we may see very analogous patterns of information integration from each level to the next.

One key idea here has to do with what is known as cross-frequency coupling, which entails synchronization of systems at different but resonating frequencies involving the whole organism. So one of the things we're very interested in is looking at the cross-frequency coupling between different neural hubs of the body, including the stomach, the heart, and the brain. One testable prediction is that, for example, when people are in more demanding situations, where they have to really draw on their full set of computational systems, the

gut will actually be more in synchronization with the heart and with the brain. More generally, we think that looking at the synchronization between multiple systems may help to provide support for the notion that information processing involves this hierarchical stacked set of resonances.

Q – I would like to finish the interview with a different kind of question. Many of our readers will be graduate and undergraduate students aiming to launch their careers as scientists. What would be your advice to any aspiring researcher in cognitive science?

A – I would say that there are a number of different things that are very important. One is finding the right mentor. It's so important to have a relationship with a person who has been in the field, who knows the ropes; there's just so much sort of tacit understanding that has to be acquired. And they also have connections, can introduce you to people... So really finding somebody who you feel a real connection with, who understands you, who you can work with, is critical, I think, to a successful career. The second thing is, find passion. It's going to be a lot of work, and you have to really get your curiosity going. So really asking questions that you're curious about, that you really want to know the answer to, I think is also very, very important. And the third thing: there are going to be times where you're just not that excited, and you will have to push yourself. You have to, even when the curiosity is not there, just do the work. Oftentimes, when you do the work, the curiosity will follow, but sometimes you just have to push yourself, to put in those long hours, do that extra mile... both when you feel inspired, and when you don't.

The interview has been edited for length and clarity.

## References

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Manuscrito recibido el 25 de abril de 2022.

Aceptado el 26 de abril de 2022.

This is the English version of

Cásedas, L. (2022). Haciéndonos preguntas sobre mindfulness, divagación mental y consciencia: Entrevista con Jonathan Schooler. *Ciencia Cognitiva*, 16:2, 41-44.

