



Creativity & the Mindful Wanderings of Dr. Jonathan Schooler

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“Perceiving something from two different angles creates a split in awareness that can lead to the ability to control perception...to move...to a space that simultaneously exists and does not exist”

~ Gloria Anzaldúa

“Mindfulness... is the miracle which can call back in a flash our dispersed mind and restore it to wholeness so that we can live each minute of life.”

~ Thích Nhất Hạnh

“Cultivating curiosity is important, but we want to cultivate it in the positive sense of encouraging people to develop a childlike wonder, a delight in understanding, in an appreciation that there is always more to learn.”

~ Jonathan Schooler

Introduction

In the Tech Trends series on Rethinking Technology & Creativity in the twenty-first Century, the Deep Play Research group has interviewed a series of creativity experts (starting in 2016)—across different disciplines and areas of interest—to

develop a nuanced and holistic understanding of the relationship between creativity, technology and learning. In this article, we continue our deep dive into the transdisciplinary realms of creativity research and scholarship with Dr. Jonathan Schooler’s work in psychology, focused on the intersections of technology, creativity, consciousness, mindfulness, mind-wandering, and curiosities.

Dr. Schooler is a Distinguished Professor of Psychological and Brain Sciences at the University of California Santa Barbara. He is also the Director of the Memory Emotion Thought Awareness (META) Lab, which is interested in broader issues and associated questions regarding the frontiers of science. His own research on human cognition explores topics that intersect philosophy and psychology, like how fluctuations in people’s awareness of their experience mediate mind-wandering and how exposing individuals to philosophical positions alters their behavior. He is also interested in the science of science (meta-science) including the replication crisis in the social sciences, understanding why effect sizes often decline over time, and how greater transparency in scientific reporting might address this issue.

Dr. Schooler’s interest in mind-wandering stems from his lived experience and identity. He has self-identified as a mind-wanderer his entire life. He recalled a first-grade teacher that described him as always being “at the end of the line, five feet behind everybody else, shoes untied, totally preoccupied and completely content.” As a researcher and scholar in psychology, Dr. Schooler was able to study mind-wandering and thus transform his personal characteristics into professional expertise. Mind-wandering has many implications for and intersections with creativity and technology, which we discussed with Dr. Schooler. With social media and digital technologies designed to capture and keep attention, there are implications for educational research and practice that raise concerns for parents, educators, and other stakeholders on how technology conditions attention and impacts creativity and learning. Recently, research on mindfulness has been trying to address the rising concerns around

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the impact of attention-seeking technologies on human cognition (Berthon & Pitt, 2019; Lippold et al., 2022). Along with research on mindfulness, a better understanding of attention and consciousness can illuminate how the curiosities and distractions of the human mind contribute to creativity, and how learning to focus attention benefits the mind.

In this article, we share the key takeaways from our interview with Dr. Schooler. We discuss the importance of being comfortable in liminal spaces where our attention exists on the intersections of states such as consciousness and unconsciousness, mindfulness and mind-wandering, and inner and outer realities. We also discuss the implications of balancing mindfulness and mind-wandering—and creating a sense of meta-consciousness—in a technology-mediated world. Finally, we discuss the significance of regular training to focus attention and how to ultimately foster curiosity. Before jumping into the key takeaways from our interview, we briefly discuss Dr. Schooler’s conception of creativity.

Creativity: Novelty and Usefulness

Our conversation with Dr. Schooler about creativity began with identifying and measuring creativity, particularly distinguishing between big ‘C’ and small ‘c’ creativity. Big ‘C’ creativity can be noted in works that bring dramatic shifts in perspectives and understanding. As Dr. Schooler noted, the contrast to this is “the smaller—sort of everyday—creativity [which is] more challenging to define.” He further elaborated:

One classic measure of creativity [is] something known as the ‘unusual uses test’... You give people a brick, and you ask them what [they would] do with it. Building a house or even using it as a doorstep is... very useful, but it's not a particularly creative use for a brick, because many people would come up with that. Grinding the brick up and using it as makeup or paint is a bit more creative.

Creativity goes beyond normative uses into newness. Dr. Schooler, like other scholars in this interview series, noted that “creativity involves a combination of novelty and some sort of value or usefulness.” The combination of novelty with utility is important because novelty alone does not suffice to describe creativity, and this novelty/usefulness intersection is where Dr. Schooler’s definition aligns with the ‘standard’ definition of creativity employed by many psychologists (Runco & Jaeger, 2012). For instance, suggesting a brick could be used as a spaceship is a novel idea but not useful. As Dr. Schooler noted:

If you give ‘unusual uses’ to a group of judges, there will be a significant degree of consensus between the

judges about what's both novel and useful, and therefore creative, but it just has to be acknowledged that it's challenging to get a sort of single, really solid definition.

In identifying the challenge of describing creativity, Dr. Schooler connected his own work on consciousness with its role in better understanding creativity as a process. Next, we discuss how being meta-conscious, that is, being aware of your own sense of consciousness, can help better balance mindfulness with mind-wandering, and foster creative curiosities in meaningful ways.

Key Takeaways

Liminality of Consciousness

Dr. Schooler’s interest in the inner workings of the mind resonates with the concept of in-between states of consciousness. A state of consciousness somewhere between being awake and asleep, slipping between conscious and unconscious—termed hypnagogia—may help us take a deeper dive into creativity and understand it as a process that is beyond an individual, perhaps post-human. Dr. Schooler described the importance of more research on the liminality of consciousness for the sake of creativity:

If you have a problem and you are stumped, you ‘sleep on it’... Even though you are not explicitly thinking about it, there still may be some processing that's going on in the unconscious that may contribute to the ultimate solution. There have been many examples in which individuals have creative ideas in their dreams, or even more so as they are falling asleep... This is semi-conscious and it suggests one of my favorite terms, which needs more research to shore it up—that is transliminality. We have *subliminal*, which is information processing going below the surface of consciousness, *superliminal* which is above, and *transliminal*, which is the permeability between conscious and unconscious. So, hypnagogia may be a perfect example of heightened transliminality, with the unconscious and the consciousness interacting. Psychedelics may also be an example of where transliminality plays out.

Understanding the importance of the liminality of consciousness helps us see that while consciousness is needed for creativity, unconscious states of mind may still be conducting creative processes without awareness. Dr. Schooler described that “we definitely need consciousness for creativity, certainly for recognizing it, but unconscious processes very likely contribute to creativity as well, and maximizing their entire relationship may be part of the trick.”

The idea of the liminality of consciousness and its role in enhancing creativity could relate to the need to balance seemingly different practices such as mindfulness and mind-wandering. Maximizing the relationship between these two may also be impactful and may be described as mindful mind-wandering (for more on the mindfulness/mind-wandering relationship, see our previous column, Richardson et al., 2022). Alternatively, purposefully engaging in mindfulness practices that cultivate other forms of attention, beyond focused attention, such as open awareness, could have an enhanced impact on creativity (Siegel, 2012).

Mindful Wanderings

Creativity has the potential to flourish in a liminal space between mindful attention and mind-wandering (Henriksen et al., 2020). While mindfulness is considered important to creative practice, Dr. Schooler's research has indicated that the correlation between creativity and mindfulness is not strong (Schooler et al., 2014). He emphasized that this could be indicative of a need to understand the role of mind-wandering. While it is useful for the mind to be aware and focused it also benefits from wandering and going with the flow. A balance between the two is important.

A wandering mind can have profound effects on the primary task one is performing. For example, "if you mind-wander while you are reading as we oftentimes do, where eyes move across the page, but our mind is somewhere else, our comprehension of what we are reading is seriously compromised." Mindfulness, on the other hand, has been shown to improve reading comprehension (Mrazek et al., 2013). Dr. Schooler further elaborated on the relationship between mindfulness and mind-wandering through extant research, emphasizing that both—while seemingly opposite constructs—have utility when it comes to creativity:

One line of research documents the costs of mind wandering and also measures mind-wandering. A second line was looking for the antidote for mind-wandering, and there we did a number of studies documenting both that mindfulness and mind-wandering are kind of—opposite constructs. The more your mind wanders the less mindful you are, and that training people in mindfulness and contemplative practices can reduce mind-wandering and thereby actually improve cognitive performance. So, we showed that by giving people training in mindfulness they mind-wandered less, and then their reading comprehension was enhanced, in part because of reduced mind-wandering. The third strand of research involved why we mind-wander so often. There must be some utility to it or we wouldn't do it so often. There we became very interested in mind-wandering and creativity and the idea that at

least certain kinds of mind-wandering may facilitate the creative process.

Mindful awareness may not always be useful in all creative tasks. Dr. Schooler described a recent study conducted by his research group that showed how mindfulness had a negative correlation with successfully solving a task. In this study, his team gave people a task, known as the remote associates test (RAT). In this task, people are given three words and must come up with a fourth word that relates to all three target words. There are often two different approaches by which people solve the RAT. As Dr. Schooler noted:

You can either solve it insightfully in the sense that you just stare at the three words and then boom, that word that ties them all together comes to mind [insight solution]. Or you can sort of analytically hammer it out. You look at the first word and think of its associates, and the second word and think of its associates, the third and look at its associates and then see if there's any common match [analytic solution]. In general, when people solve these with an insight solution they're a bit more accurate [than] when they solve it with an analytic one. We looked at the relationship between mindfulness as measured by a standard mindfulness questionnaire and performance on the RAT. And we found that it was negatively correlated. The more mindful people were, the worse they did on this particular task, but that was moderated by the fact that it depends on how they solved it. So, people who were higher in trait mindfulness were more likely and more successful at solving it analytically whereas those who were lower in mindfulness just sat there until the solution insightfully popped to mind. But since solving it with insight tends to be a more effective solution, the lower mindfulness participants were overall more successful. So, potentially...*mindfulness may be associated with one strategy for creativity, which is more of an analytic approach, whereas mind-wandering may be more associated with an insight approach where solutions can pop to mind.*

While mindfulness was useful in solving the tasks, it was particularly effective for those who took an analytical approach. The participants who scored high on mind-wandering benefited from a more intuitive approach. This has further implications for a balanced mindful wandering where one is aware of the wandering mind itself—simply observing without judgment or desire to control the train of thoughts.

In other related research, Dr. Schooler found that mindfulness meditation improved well-being but not necessarily creativity. He also referred to a study on ADHD that showed connections between mind wandering and creativity, in which he and his team did a large

mindfulness intervention, with people doing meditation and yoga and various mindfulness exercises and instructions for six weeks. He found that this intervention improved their performance in a variety of different tasks, reduced their mind-wandering, and increased their well-being. However, this did not improve creativity, as he noted:

Many studies have found a relationship between ADHD and creativity, and ADHD is distractibility, not mindfulness. So, a number of strands suggest that there may be a certain aspect of distractibility and loose association which may be associated with creativity, which may be curtailed in a certain sense by mindfulness. That said, there was a meta-analysis looking across studies that found a modest but significant positive relationship between mindfulness and creativity. And, there's been at least one study showing that a particular kind of meditation, termed open-monitoring meditation, may facilitate creativity.

Siegel (2018) describes open-monitoring, also known as open awareness as “letting things simply arise, being in an open, receptive state” (p. 39). A practitioner may begin by focusing their attention on a common anchor, such as the breath, and then eventually place their attention on being open to observing what they are aware of (Lippelt et al., 2014). This way of paying attention to direct experiences as they arise could include being open and aware of thoughts, emotions, memories, or even the experience of being aware of awareness itself. The mindfulness practitioner in this case might be open and aware of the form their thoughts take. By engaging in this practice, the practitioner may become aware that they are thinking, what they are thinking, and the form thoughts take as they emerge into consciousness. For example, thoughts may arise in response to hearing sound, following a body sensation, or as images, on the “screen of consciousness.” Attention on what arises in the moment, for example, may naturally and seamlessly shift from thoughts to noticing ambient sounds in the environment. Siegel (2018) notes that this ability to be both aware of awareness itself and aware of what is in awareness is essential to the integration of consciousness. Without this ability, he suggests, we get lost in our experiences.

Creativity needs both mindfulness and mind-wandering; neither by itself is enough. Creativity, he suggests, exists somewhere in the ebb and flow between an aware and a wandering mind, where you are letting the mind wander while you mindfully follow through with the strands of your thinking. This has further implications in technology-mediated spaces where media is intentionally being designed to capture attention and keep

it through features like endless scrolling, positive reinforcements of notifications, and catchy multimodal content aiming for virality.

Technology: Bane and Boon

When it comes to social media platforms, intentional design to hook and trap attention may have detrimental effects on people's sense of well-being, belongingness, mindfulness, and even creativity (Haidt & Allen, 2020). Being addicted to social media and smart devices may become a liability when it leaves little time for free-thinking, wonderment, and downtime (Mehta & Mishra, 2016). With increasing distractibility through technology and social media, there are challenges to how much its design impacts people's ability to focus and how much mind-wandering is beyond their control. Dr. Schooler discussed the challenges that technology use can present:

Our addiction to our smartphones could have a liability when it comes to creativity. Many ideas happen when one is just taking a walk and just thinking, letting ideas freely move. If we were always looking at our cell phones—if Archimedes was in the bath and instead of just thinking about the Crown he was checking his email on a cell phone, he might never have come up with the solution for water displacement. So, putting down the technology and letting ourselves just freely associate is really important.

Dr. Schooler advances the notion of “entertaining without endorsing” ideas and aligning oneself with balance and moderation when it comes to technology. He emphasized the need to be digitally and media literate—for learners to be in control of their curious explorations and wonderments when it comes to digital technology:

When used in moderation, it provides so much information, so you can explore your passion, your curiosity, and then mind-wander about that. Technology offers a world of information readily available to us. Individuals can be skillful and discerning in the material that they explore when they are using technology. That can give them, really, really fruitful material to mind-wander about.

The impact of technological development can be studied in a number of ways. Whether it involves learning and educational technologies, or technology for better understanding of the mind itself, the concerns around the future of technology are balanced by its potential benefits. Dr. Schooler shared his concerns and hopes with technology, including but not limited to privacy of thoughts, the impact of neural technologies on the functioning of the brain, and virtual reality:

They are increasingly using technology and machine learning to begin to decipher the actual content of people's thinking. There is a Black Mirror episode where the woman actually gets into the person's brain and sees things that he wouldn't have wanted them to see. I do worry about the possibility that the privacy of our brains could, at some point, be lost. And then I have mixed feelings about the possibility of virtual reality actually being driven in the brain itself. You can imagine how this would be extremely exciting to be able to actually induce dream-like virtual reality experiences, which is something that they are moving toward thinking about. But, at the same time, you can imagine how this might undermine people's motivation to deal with the real world and all sorts of questions of authenticity. It's a complex area that I think has real promise but also significant dangers.

At the same time, Dr. Schooler shared his excitement about how technology can allow for further explorations utilizing mind-wanderings in creative processes:

One thing that we have been discovering is that not all mind-wandering is created equal. There are certain kinds of mind-wandering, what we're calling a curious mind-wandering or *mind-wondering*, which may be especially fruitful for cultivating creativity. So, if individuals use the technology to explore topics that they find interesting, but then put it down and 'mind-wonder' about the material that they have discovered, I think that's extremely useful.

In Dr. Schooler's perspective, a better sense of self-control when it comes to social media and digital technology should be emphasized. Intentionally using smart technologies to shape mind *wonderings* allows a mindful exploration of our curiosities directed toward creative aspirations. Dr. Schooler was also hopeful about specific tools and technologies that can be designed to support creativity:

There are also apps that are now available in terms of creating remarkable three-dimensional representations and pixelation art and music in different ways. There are all sorts of ways in which, in principle, individuals can collaborate with technology to create genuinely creative products. I think there is a huge opportunity with technology, but also some risks.

Being conscious of the impact of social media and smart technologies is the first step in identifying whether our relationship with technology is beneficial or detrimental to our creative well-being. There is also potential for technology to be used to create a better sense of well-being in society. The intersection of technology and mindfulness creates new spaces that had not existed

before. He noted that he is excited about the opportunities for brain stimulation as a technique for fostering mindfulness, pointing to the work of Jay Sanguietti at the University of Arizona, whose research uses ultrasound to target particular regions in the brain. Dr. Schooler described this further:

The nice thing about ultrasound compared to say TMS [Transcranial Magnetic Stimulation], which is electrical stimulation, is that you can target it deeper in the brain. The other nice thing is that there...is a lot of excellent safety data with respect to ultrasound. What they have been doing is targeting a particular region of the brain, the PCC [Posterior Cingulate Cortex], which is associated with the default mode network, which is a region that is very much associated both with mind-wandering and with self-reflection. When they target this region they are getting self-reported changes in people's experiences that are actually similar to the kind of reports that people have under deep meditation. When people meditate, you get reductions in activation in this region, which is also associated with low doses of psychedelics. I think that the possibility of using technology to help us quiet the chatter of the mind, to dampen down the ego a bit, and to get into a state that is sort of closer to the ego-less state that sages have talked about over the millennium is a real possibility, and something I know I'm very excited about.

The potential of technology like ultrasound to help people reach deeper ego-less states of consciousness similar to professional meditators, monks, and sages, can have significant social impacts, including in the field of education. With more research and accessible resources, meditation may be better scaffolded for the general public, changing how we approach mental health and well-being.

In the conversation around technology and its connections with creativity, focus was a central factor that was mentioned in a number of ways. Particularly, the need to train the mind to be aware of where attention is in a given moment is important, considering the types and ways the mind can be distracted. Our next takeaway further explores this topic.

Focus Training: Meta-Awareness

Training to focus better, with intention, and being aware of your own attention gives power and direction to curiosity. When to flow, when to sit, when to pause, when to play, when to resist, when to indulge—is a liminal balancing act in which lies beauty and creativity. This is a skill, a muscle that needs to be built with training. Dr. Schooler explained that meta-consciousness and meta-awareness can be important for creative well-being:

Although we are conscious, from the moment we wake up in the morning till we fall asleep, we are only intermittently meta-conscious. Only periodically do we take stock of what is going on in our minds. This is why mind-wandering can last for so long. I'm trying to attend to the texts that I'm reading, but my mind has wandered off rather than catching that right away. I don't notice it. I haven't taken stock of what I'm doing. I haven't noticed that my mind is gone. And if you've tried to meditate you have had the experience of focusing on your breath and then, even though you have this very clear goal of watching your breath, suddenly realizing that you had completely lost track of your breath and that you have been thinking about something else for some period of time. So, this is what I call meta-awareness, the periodic explicit awareness of what is going on in your experience.

Further unpacking the relationship between awareness and consciousness, Dr. Schooler helped us see connections with focus and flow:

Awareness, you could define as the focus of your consciousness. And that awareness could be directed. If you're in a flow state, you have no meta-awareness. One of the interesting things about flow is you completely lose the sense of you and yourself, you are so engaged in the activity. And again flow is where you are doing a demanding task, where you have the resources, you are just at the maximum of your ability and the demands of the task so all your resources are just dedicated to that task. You are playing tennis, you are writing a novel, whatever, you are just totally absorbed, and, in that state, your awareness is very, very clearly targeted on whatever it is that you are doing, but your meta-awareness is completely lacking, and so I would equate awareness with the focus of attention.

This brings us to the importance of training to better focus our attention not just on being aware, but being aware of awareness itself. This could support better life satisfaction and emotional regulation. Dr. Schooler and his colleagues have used technology to support focus training by developing an app that teaches students to better focus:

The app is called *Finding Focus*...This program essentially teaches students how to train their focus, and how to appreciate that the capacity to regulate our attention is within our own skillset... We have done a number of studies demonstrating that individuals report that this leads to reduced mind-wandering, greater life satisfaction, and enhanced emotional regulation. Introducing and teaching students how to cultivate their attention regulation skills, in

this world where we are constantly being pulled by the distractions of social media and smartphones, is a very important thing. I am delighted that we have been working on a program that can really play itself out in any high school throughout the nation or you know any English-speaking place anywhere, essentially.

Dr. Schooler also emphasized the importance of moving away from standardized testing into more curiosity-driven education that cultivates creativity. In our final takeaway, we discuss the significance of curiosity in creativity.

Fostering Curiosities

When describing his own relationship with creativity, Dr. Schooler emphasized the need to foster curiosity in transdisciplinary spaces in ways that allow inquiries about the world and self to flow seamlessly across artificial disciplinary boundaries.

I would have to say that my ultimate motivation is curiosity itself. Certain topics and issues just grab me and I will try to think about if there is anything that I might have to say or contribute in that particular direction. I do think that interdisciplinary or cross-disciplinary research can be a very fertile source for creativity.

The need to foster curiosity has direct educational implications. Education needs to focus on moving beyond standardized testing to teaching in ways that excite curiosity and cultivate their sense of creativity, unbounded by disciplinary subject matters. Dr. Schooler, too, emphasized that transdisciplinary pursuits, especially the ones that integrate arts, music, and visual modalities are critical for holistic development. With socialization and play, a creative playful mindset can be developed that fosters students' curiosities and wonderings. Dr. Schooler shared his concern with these missing elements in educational systems:

I think all these things are critical elements that need to be reinvigorated in the educational system. It's been a shame to see recess cut out, arts programs cut out, students just expected to regurgitate and then being dominated by distraction.

Further, on the topic of curiosity itself, building on Jordan Litman's work, Dr. Schooler warned us that not all curiosities are created equal. While there is *general interest curiosity* that has to do with the childlike wonder or a desire to learn new things, there is also *deprivation curiosity* that comes out of the dislike of not knowing something. Deprivation curiosity, in contrast to General Interest curiosity, is less correlated with creativity, and "is associated with

poor memory and people thinking they know things that they do not know.” Deprivation curiosity may contribute to some people’s tendency to believe and willingness to share fake news.

Warning us of deprivation curiosities—a dark side of curiosity, Dr. Schooler re-emphasized the need to develop childlike curiosity among students in schools:

I really think that cultivating curiosity is important, but we want to cultivate it in the positive sense of encouraging people to develop a childlike wonder, a delight in understanding, in an appreciation that there is always more to learn, rather than a need to know in order to fill some void.

Conclusion

A wandering mind can be a powerful tool for creativity and imagination, although it also can bring its own challenges to focus and performance. Openness to new experiences, curiosity, and interest in doing new things all feed into creativity. But, mind-wandering can be detrimental when untethered. It is associated with distraction and a lack of discernment. Distractibility thrives in a digital landscape where apps are loaded with gimmicks for companies to profit off of our attention—and human attention is a tremendous commodity that can be harnessed for better or worse. Cultivating mindfulness with intentionality of what you do with your attention can offer a kind of antidote to the challenges of a wandering mind, so long as we make space for the kind of curious “mind-wondering” noted by Dr. Schooler and his work. Mindfulness is the yin to the yang of mind-wandering. What Dr. Schooler called open mindfulness, we might also call mindful wanderings.

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