

CREA

and the Agile





TIVITY

Mind

Most of us would like to be more creative. We may wish we could write, or draw, or play a musical instrument better. Or invent a new bestselling product, like a blockbuster toy or an app for a smartphone. » But even those of us who do not aspire to become another Toni Morrison or Steve Jobs may wish to bring more imagination and originality to our everyday activities, from cooking to gardening to remodeling the house.

Or we'd just like to be better at problem solving, both on the job and in the home.

For centuries, philosophers and scientists have been trying to understand the creative mind. Why do some people appear more creative than others? What internal and external factors influence creativity? How can individual creativity be cultivated and developed?

In her lab at the University of Minnesota, cognitive neuroscientist Wilma Koutstaal, has been exploring these and other fascinating questions about the human mind's capacity to innovate. That research has led her to develop a unique framework to describe what she refers to as *agility of mind* or *agile thinking*.

In simplest terms, Koutstaal defines the agile mind as one that moves nimbly back and forth between specific and abstract thoughts and between automatic (intuitive) and controlled thinking processes. And it does this under the continuous influence of emotion, action, motivation, and environmental cues.

Agile thinking is not the same as creativity. It's a much broader concept. But creativity does require an agile mind.

Koutstaal has given her framework for the agile mind a distinctive acronym: iCASA, which stands for integrated Controlled-Automatic, Specific-Abstract. Drawing on evidence from neuropsychology, developmental psychology, social psychology, and other related disciplines, as well as on insights from the arts and literature, the iCASA framework offers a more encompassing and nuanced theory about adaptive thinking than the standard two-system model of cognition that divides thinking into "intuitive" and "rational" categories.

"We—and our minds, brains, environments—are much more improvisational than we recognize," says Koutstaal, "and we should learn and develop habits of thinking and acting that enable us to best capitalize on this to optimize creativity and innovation."

Last year, Koutstaal published a massive book on her research, aptly titled *The Agile Mind* (Oxford University Press). It received wide praise from other scholars—and won the American Psychological Association's prestigious 2012 William James Book Award, which honors exceptional books that bring a unique and interdisciplinary approach to the field of psychology.



JONATHAN BINKS

Psychologist Wilma Koutstaal is developing step-by-step thinking procedures that can help us enhance creativity and solve problems.

Detailed vs. abstract

For Koutstaal to win an award named after William James, the Father of American Philosophy, seems more than fitting, for his writings were a major early influence on her research. Of particular interest to Koutstaal were James's observations on the importance of finding the appropriate level of detail and abstraction in thinking.

James emphasized the human need for abstract concepts, such as truth, knowledge, happiness, and reality. Such concepts, he wrote in his 1911 treatise, *The Meaning of Truth*, enable us to travel "with a hop, skip and jump over the surface of life at a vastly rapider rate than if we merely waded through the thickness of the particulars."

Yet, while not getting bogged down in particulars is important, so, warned James, is the opposite: not taking a concept so far out of its context (the experiences from which it emerged) that it loses its original meaning. James dubbed this problem "vicious abstractionism."

Koutstaal has focused much of her research on exploring the question of how and why the mind maneuvers through different levels of abstraction and detail.

"There are problems that arise from being overly abstract," she notes. "This could include

being overly global and not sufficiently related to the local circumstances. We see this in chronic worry, for example, where rumination takes over, and there are negative flights of fancy. Or we may see it in theater or sports, where sometimes one worries too much about the overall broad implications of the performance rather than focusing more closely on the performance itself."

On the other hand, overfocusing on specifics is also problematic. "Then things can become fragmented, and we fail to see the big picture," she explains. "We can become too literal and fail to see the relations among things and events. When this happens, we may fail to benefit from our past experiences because we cannot see how something that we did that was similar might be useful in our current context."

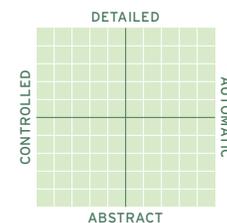
Koutstaal's laboratory research has revealed just how important it is to the creative process to be able to move flexibly between levels of abstraction and specificity. In one experiment, published in 2010 in the journal *Psychology and Aging*, 72 adult volunteers were shown pictures of objects and then later asked to remember whether each picture had been presented to them in a specific or an abstract way. (For example, did they remember a picture of an old sofa as "a sofa" or as "old"?)

The volunteers' accuracy in performing this task was measured. Then they were given a standard on-the-spot problem-solving test. Those who had exhibited the greatest ability to shift in their memories between levels of abstraction and detail also tended to be the ones who were most successful at problem solving.

These findings suggest, says Koutstaal, "that flexibility of thinking depends on our ability to encode, recall, and use information at differing levels of abstraction." She is currently extending this research to develop detailed, step-by-step thinking procedures that individuals might use to enhance their creativity and on-the-spot problem solving.

Creativity: It's Complicated!

Your brain continuously receives and registers information from your senses, interprets it, and organizes new information based on your prior experiences.



Throughout the creative process, you and your brain respond to information in ways that are more or less automatic or controlled, and in ways that are more or less abstract or detailed. This process encompasses all of your creative reactions— involving concepts, perceptions, emotions, and motivations.

When you act in response to your environment, you alter it, and your perception of it. Then you respond to the new environment. In this way you are engaged in a constant cycle of “finding” (your environment) and “making” (a new environment).



Controlled vs. automatic

For a mind to be agile, therefore, it must slide effortlessly between abstraction and detail, finding the appropriate level at the moment when it is most helpful. But this aspect of agile thinking pertains only to the content of thought. Agile thinking also requires that the processes by which thought occurs be fluid, says Koutstaal.

In other words, the mind must move smoothly back and forth through levels of controlled (highly deliberate) and automatic (intuitive) thinking.

And that can be difficult. “Sometimes we try too hard, when really what we need to do is let up,” says Koutstaal. Or, conversely, she adds, we sometimes let our minds “drift” for too long, when bringing more deliberation to our thoughts would be more advantageous.

Creativity, or “improvisation,” says Koutstaal, “is about allowing your brain to be more integrative and to pick up on conceptual and physical opportunities that you didn’t ‘know’ were there. But it doesn’t mean that you go completely off course. You will have a goal, but it is how you hold on to the goal that makes all the difference. You hold on to your goal with a permissive or less-tight ‘grip.’”

‘Making’ and ‘finding’

Another central element of Koutstaal’s iCASA framework is the idea of “making and finding,” which, she points out, comes directly from the art world.

“‘Making’ is mostly about our abstract goals and plans and what we overall hope or expect to accomplish,” she explains. “‘Finding’ is what our initial attempts at making produce or accomplish in the world. In finding, we look at what we have done or accomplished and then modify our goals or process.”

Or, as Pablo Picasso once said: “You don’t make art, you find it.”

The human mind is constantly engaged in this perception-action cycle. You perceive (“find”) your environment one way, and then you take some kind of action based on that perception. That action alters your environment, which in turn alters your perception of it. So you act again, based on your new perception. And so on.

Throughout this cycle, the content of your thoughts alternates between specific and abstract, and the way you think swings back and forth between automatic and controlled. The more smoothly and appropriately you make these shifts in content and processing, the more agile your mind—and the more creative you are likely to be.

Obvious examples of the making-finding creative process can be seen in the sculptor who constantly readjusts her vision for a granite statue based on how the stone responds to her chisel, or in the jazz pianist who improvises based on the musical responses of the other musicians with whom he’s performing.

But examples can also be found in less obvious places, such as a hospital operating room. A surgeon is in a perception-action cycle as she takes out an appendix, for example. She may begin the operation in “automatic mode” (most appendectomies are routine and the surgeon may have done hundreds of them in her career), but should something unexpected occur—the appendix is found to have ruptured, for example—then she responds with more focus (control) as she works

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Most of life is improvisation – the world is always different

on solving the new medical problem she has “found.”

Understanding the perception-action cycle helps get us past the idea that cognition is either intuitive or deliberative, explains Koutstaal. “It’s much more fluid and dynamic than that,” she says.

It’s also why innovative people start working and problem solving without waiting for their creative muse. “Steve Jobs once sent an email to someone that had just one word—‘Go!’—in it,” says Koutstaal. “At some point, you just have to go. You can’t wait for inspiration. The inspiration comes in the making.”

Outside influences

Many factors, including memory, experience, mood, and sensory cues from the immediate environment, affect where on the continuums of control and specificity our thoughts are at any given moment.

Imagine, explains Koutstaal, being asked to come up with creative alternative uses for a simple common object—say, a penny. You are likely to draw on your memory first. You may remember something unconventional that you once did with a similar coin, such as using it as an impromptu screwdriver or as a steadying wedge under a wobbly table leg. Or you may remember observing or reading about somebody else using a penny in a memorable way, such as to check the tread wear on automobile tires.

Through persistence, however, and by studying and interacting with the physical properties of the coin, you may soon generate other ideas, ones that don’t come from your own memories. By banging the penny on a table, you may envision using it as a miniature gavel. Or by rolling the coin on its edge, you may imagine using it to scratch messages into soft surfaces.

“In other words,” says Koutstaal, “the processes of thinking about novel uses involve [more than] concepts, but also what you perceive and

how you imagine yourself physically interacting with an object in the world.”

Scientists have long used such alternative-use tasks as a way of measuring and assessing creativity. But research in Koutstaal’s lab and elsewhere has demonstrated that just by engaging in such tasks, people can develop more flexible thinking.

In one experiment, published in the *British Journal of Psychology* in 2009, Koutstaal and her colleagues randomly assigned 160 undergraduate volunteers to one of three groups. One group was asked to spend 10 minutes generating nonconventional uses for several different objects, such as a chair and a pencil. Another group was given the same amount of time to do a word-association task (writing down the first word that comes to mind in response to a list of words). The third group was assigned neither of these tasks.

All the students were then asked to perform two different problem-solving tasks within a set period of time. One of these tasks was a series of six “insight” problems that require people to think outside the box or to creatively restructure the problems in order to solve them. The other task was a series of wordless paper-and-pencil tasks designed to assess people’s ability to do on-the-spot visual-spatial reasoning (such as selecting which of five abstract shapes do not belong with the others).

Half of the students from each group were given the insight problems first; the others were given the visual-spatial reasoning problems first.

The results showed that the volunteers in the alternate-use task group solved significantly more of both types of problem-solving tasks within the given timeframe than did those in the other two groups.

“Simply doing the task for as little as 10 minutes increased insight problem solving and novel on-the-spot visual-spatial relational reasoning,” says Koutstaal, noting that these findings have since been replicated in her lab and elsewhere.

than it was before.

'Life is improvisation'

Is everybody creative? Yes, says Koutstaal. "The fact that we use language suggests so. We rarely use the same sentence twice."

We have to be creative in order to successfully navigate our environment, she says. "The world is always different than it was before, so we're always adjusting or inferring what we need to do in the current circumstances."

Having an agile mind, therefore, is essential to the creative process, whether we're writing the Great American Novel or creating a software program or launching a company. With an agile mind we can pay attention to details when it's important to do so, but then pull back and consider the bigger picture when necessary. We can control our thought processes when deliberation is needed, but then relinquish that control and "go with the flow" at other times.

People who seem particularly creative are often individuals who have developed optimal agile-thinking habits or who have a deep understanding of their own creative processes, says Koutstaal. "They may be doing something that works particularly well for them," she explains.

Fortunately, the rest of us can develop those habits, too. And understanding the underlying framework of the agile mind will help. "Most of life is improvisation," says Koutstaal. "We always have ideas coming in and out of awareness. But some ideas might be beneath awareness. We need to access those ideas and hold on to them when we need to." ∞

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WAYS to Boost Mental Agility

Everybody can develop a more agile – and creative – mind, says University of Minnesota cognitive neuroscientist Wilma Koutstaal. All that's required are some simple changes in the way we approach the content and processing of our thoughts. Here are her nine key tips:

- 1 Regularly expose yourself to new things, including new environments. Novelty is an important stimulus for the brain – and for creative, agile thinking.
- 2 Vary the level of control in your thinking. When your thinking feels "stuck," try harder to exert control – or try less hard.
- 3 Vary the level of specificity in your thinking. Avoid what William James called "vicious abstractionism" (taking statements out of their context), but don't get too bogged down in specifics, either.
- 4 Reward yourself – and others – for using varying levels of control and specificity when problem solving and innovating.
- 5 Capture ideas as they happen. Because our mental accessibility to our environment is always changing, reconstructing ideas that occurred even a few moments earlier can be difficult.
- 6 Develop ideas in parallel rather than one at a time. Doing so will help keep you from overinvesting in a single idea or version of an idea.
- 7 Pay attention to your inner voices – your sensory perceptions, mood, memory, and knowledge.
- 8 Use and respond to your environment as part of your mind. The environment is not entirely separate from your mind, and it is often easier to control.
- 9 Capitalize on the interplay of intrinsic motivation (doing something for the love and joy of it) and extrinsic motivation (doing it for financial or other rewards). Realize that each can contribute to creativity.