"You'll see people bolt up in their chair and their eyes go all wide," Ezra Wegbreit, a graduate student in the Jung-Beeman lab who often administers the C.R.A. test, said. "Sometimes they even say 'Aha!' before they blurt out the answer." The suddenness of the insight comes with a burst of brain activity. Three hundred milliseconds before a participant communicates the answer, the EEG registers a spike of gamma rhythm, which is the highest electrical frequency generated by the brain. Gamma rhythm is thought to come from the "binding" of neurons, as cells distributed across the cortex draw themselves together into a new network, which is then able to enter consciousness. It's as if the insight had gone incandescent.

Jung-Beeman and Kounios went back and analyzed the information from the fMRI experiment to see what was happening inside the brain in the seconds before the gamma burst. "My biggest worry was that we would find nothing," Kounios said. "I thought there was a good possibility that whatever we found on the EEG wouldn't show up on the brain imaging." When the scientists looked at the data, however, they saw that a small fold of tissue on the surface of the right hemisphere, the anterior superior temporal gyrus (aSTG), became unusually active in the second before the insight. The activation was sudden and intense, a surge of electricity leading to a rush of blood. Although the function of the aSTG remains mostly a mystery—the brain is stuffed with obscurities—Jung-Beeman wasn't surprised to see it involved with the insight process. A few previous studies had linked the area to aspects of language comprehension, such as the detection of literary themes and the interpretation of metaphors. (A related area was implicated in the processing of jokes.) Jung-Beeman argues that these linguistic skills, like insight, require the brain to make a set of distant and unprecedented connections. He cites studies showing that cells in the right hemisphere are more "broadly tuned" than cells in the left hemisphere, with longer branches and more dendritic spines. "What this means is that neurons in the right hemisphere are collecting information from a larger area of cortical space," Jung-Beeman said. "They are less precise but better connected." When the brain is searching for an insight, these are the cells that are most likely to produce it.

The insight process, as sketched by Jung-Beeman and Kounios, is a delicate mental balancing act. At first, the brain lavishes the scarce resource of attention on a single problem. But, once the brain is sufficiently focussed, the cortex needs to relax in order to seek out the more remote association in the right hemisphere, which will provide the insight. "The relaxation phase is crucial," Jung-Beeman said. "That's why so many insights happen during warm showers." Another ideal moment for insights, according to the scientists, is the early morning, right after we wake up. The drowsy brain is unwound and disorganized, open to all sorts of unconventional ideas. The right hemisphere is also unusually active. Jung-Beeman said, "The problem with the morning, though, is that we're always so rushed. We've got to get the kids ready for school, so we leap out of bed and never give ourselves a chance to think." He recommends that, if we're stuck on a difficult problem, it's better to set the alarm clock a few minutes early so that we have time to lie in bed and ruminate. We do some of our best thinking when we're still half asleep.

As Jung-Beeman and Kounios see it, the insight process is an act of cognitive deliberation—the brain must be focussed on the task at hand—transformed by accidental, serendipitous connections. We must concentrate, but we must concentrate on letting the mind wander. The patterns of brain activity that define this particular style of thought have recently been studied by Joy Bhattacharya, a psychologist at Goldsmiths, University of London. Using EEG, he has found that he can tell which subjects will solve insight puzzles up to eight seconds before the insight actually arrives. One of the key predictive signals is a steady rhythm of alpha waves emanating from the right hemisphere. Alpha waves typically correlate with a state of relaxation, and Bhattacharya believes that such activity makes the brain more receptive to new and unusual ideas. He has also found that unless subjects have sufficient alpha-wave activity they won't be able to make use of hints the researchers give them.

One of the surprising lessons of this research is that trying to force an insight can actually prevent the insight. While it's commonly assumed that the best way to solve a difficult problem is to focus, minimize distractions, and pay attention only to the relevant details, this clenched state of mind may inhibit the sort of creative connections that lead to sudden breakthroughs. We suppress the very type of brain activity that we should be encouraging. Jonathan Schooler has recently demonstrated that making people focus on the details of a visual scene, as opposed to the big picture, can significantly disrupt the insight process. "It doesn't take much to shift the brain into left-hemisphere mode," he said. "That's when you stop paying attention to those more holistic associations coming in from the right hemisphere." Meanwhile, in a study published last year, German researchers found that people with schizotypy—a mental condition that resembles schizophrenia, albeit with far less severe symptoms—were significantly better at solving insight problems than a control group. Schizotypal subjects have enhanced right-hemisphere function and tend to score above average on measures of creativity and associative thinking.

Schooler's research has also led him to reconsider the bad reputation of letting one's mind wander. Although we often complain that the brain is too easily distracted, Schooler believes that letting the mind wander is essential. "Just look at the history of science," he said. "The big ideas seem to always come when people are sidetracked, when they're doing something that has nothing to do with their research." He cites the example of Henri Poincaré, the nineteenth-century mathematician, whose seminal insight into non-Euclidean geometry arrived while he was boarding a bus. "At the moment when I put my foot on the step," Poincaré wrote, "the idea came to me, without anything in my former thoughts seeming to have paved the way for it. . . . I did not verify the idea; I should not have had the time, as, upon taking my seat in the omnibus, I went on with the conversation already commenced, but I felt a perfect certainty." Poincaré credited his sudden mathematical insight to "unconscious work," an ability to mull over the mathematics while he was preoccupied with unrelated activities, like talking to a friend on the bus. In his 1908 essay "Mathematical Creation," Poincaré insisted that the best way to think about complex problems is to im-