



Balancing the Legal Mind

By Donalee Markus and Lindsey Paige Markus

Donalee Markus, Ph.D., a cognitive therapist who is founder of Designs for Strong Minds (DSM), has helped individuals and corporations maximize thinking power for more than 30 years. Her corporate clients have included Los Alamos National Laboratory, McDonald's, Ameritech, Coopers & Lybrand, Britannica, Quaker Oats, the United States Federal Court System, and NASA.

Lindsey Paige Markus, M.A., joined DSM in 2001 and works on developing exercises related to the aging brain and successfully remediating post-traumatic brain-injured patients. She is also a second-year law student at Loyola University School of Law, Chicago.

To an outsider looking in, the practice of law in twenty-first century America is a precarious balancing act. Perhaps that is why many television viewers find shows that feature characters as lawyers (*L.A. Law*, *Law and Order*, *The Practice*, etc.) or trained in law (*The West Wing*) so compelling. Dramatic tension is inherent to these shows. A cynic may write this fascination off as evidence that lawyers are people Americans love to hate, but I think the interest is genuine. Even with such a preponderance of lawyers these days (virtually every family has one), they continue to be regarded as a breed apart—something truly respected.

Some people seem to be born lawyers. From an early age they displayed an aptitude for argument, or perhaps they found their aspiration in a movie or TV series. Other people seem to stumble into law, perhaps as a logical course of study beyond their liberal arts degree. The best lawyers display an agility to simultaneously reason inductively and deductively—to weave compelling arguments out of the smallest details and most obscure relationships. As a connoisseur of cognition, I find the legal mind endlessly fascinating.

For over 20 years my work has involved retraining brains in ways that parallel a liberal arts and legal education. The difference is that instead of the typical legal education of endless note taking,

lecture halls, and years of expensive tuition, I teach through the pleasant distraction of visual puzzles.

In Praise of Puzzles

As a cognitive therapist, I have trained high-functioning adults at NASA, Los Alamos National Laboratories, Ameritech, McDonald's, the University of Chicago hospitals, and the federal judiciary system to enhance their perspectives and flex their mental muscles through specially developed puzzles. The puzzles that predominate lateral thinking books are verbal (i.e., language bound) and, consequently, may be slanted toward culture, gender, or age—making some solutions seem arbitrary or questionable at best. Visual puzzles are more straightforward, laying out clues that anyone with an agile mind can see.

Even when applied randomly, puzzles can help maintain mental sharpness as our brains age. This is important because someone who is currently 65 can be expected to live another 18 years or more. Recent scientific studies have demonstrated that mental agility plays an important role in enjoying a healthy, satisfying, and productive life in our later years.

Just as any physical activity is better than none where our bodies are concerned, crossword puzzles and bridge games can help exercise our minds. By creating and organizing puzzles into

specific cognitive groupings (such as analogies, progressions, part/whole relationships, etc.) and arranging them in levels of difficulty, I've developed a full mental workout program that does for the mind what a personal trainer can do for the body. I've included a few of my puzzles at the end of this article to help stretch your mental muscles. You'll experience your reasoning from a different perspective—a visual one. The puzzles were designed to slow down your thinking so you can see what is going on in your mind. They are not easy to solve. They require an eye for detail, systematic thinking, and open-mindedness that exemplifies the legal mind at its most agile.

Dissecting the Legal Mind

My work in the practical application of cognitive science led me to wonder why lawyers think so differently than most of my clients. I now offer my conclusions backed by research by Keith J. Holyoak of the University of California, Richard E. Nisbett of the University of Michigan, and Donald A. Schon of MIT.

In *Mental Leaps: Analogy in Creative Thought* (Cambridge, Mass.: The MIT Press, 1995), Holyoak argues that humans and other higher-order animals naturally learn through analogies because, in order to survive, "our minds must somehow form ideas that go beyond anything we can directly experience." This ability to identify similar elements in diverse objects is evident in children as young as 4 years old.

Analogical thinking is inductive and expansive. It is the process by which we link new learning to old, generate ideas, and communicate with each other. Because the process springs from our genetic makeup, it is easy to overlook. Through storytelling and cultural experiences, we become efficient at applying analogies, but that same efficiency can get in the way of effectiveness. In other words, not all analogies are created equal. A well-formed analogy (one that is constrained by similarity, structure, and purpose) can fire the listener's imagination, create new industries, and lead to a greater understanding of the universe. Poorly formed analogies can lead to miscommunications, missed opportunities,

and misunderstandings that may erupt as domestic squabbles or, in the extreme, generate international war.

As much as anything, the purpose of law school is to harness the mind and make it more effective. In *Rules for Reasoning* (Hillsdale, N.J.: Lawrence Erlbaum Associates, 1993), Nisbett demonstrates that training in law has an indirect though measurable influence on IQ scores, especially on the deductive process of conditional and biconditional reasoning (i.e., the establishment of rules and orderly procedures). Where inductive reasoning takes a specific circumstance and expands it to a general expectation, deductive reasoning takes a general concept and tests it against a specific situation.

In New Age lingo, inductive or creative thinking resides in the right hemisphere of the brain while deductive or rational thinking occupies the left. Current research in neuro-cognition reveals that our brains aren't quite so neatly segmented. In fact, much of the time a good deal of communication goes on between left and right hemispheres via the corpus callosum—a band of approximately 80 million axons (i.e., neural branches). The corpus callosum bridges the cortical or thinking parts of our brains, thus linking the holistic right side with the detail-oriented left. In the example below, the image of the square is recognized by your right hemisphere, but the "Gs" that compose it are detected by your left hemisphere. Whether you notice the square or the Gs first indicates your cognitive preference.

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G G G G G G G
G           G
G           G
G           G
G           G
G           G
G           G
G G G G G G G

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The Consequence of the Paper Chase

What is significant for our purpose here is the relationship between deductive thinking and language. For 95 percent of us, the ability to speak and understand language is situated in the left hemisphere—spreading throughout the temporal lobe (located above the ear), forward into the frontal lobe (where planning, problem-solving, and behavioral control take place), and backward

Words are abstractions, and the meaning of any individual word can be as elusive as the Holy Grail.

Technology has also shown that the most recently evolved part of our brain, the cerebral cortex, has an amazing capacity for rewiring itself.

Editor's Note

For more information and to play 42 interactive brain games, visit www.designsforstrongminds.com. In addition, the authors published *Retrain Your Business Brain: Outsmart the Corporate Competition in 2003*. It is available from Dearborn Trade Publishing.

into the parietal lobe (where auditory, tactile, and visual signals are integrated).

Language is not necessary for thinking. In fact, as demonstrated in studies using functional MRIs, most thinking occurs not only on a nonverbal level but also on a nonconscious level. However, language is necessary for laws. Linguists may quarrel over whether grunts, gestures, and odors constitute language capabilities in other animals, but all social creatures must have some means of maintaining order within the rank. For humans, language is the means by which social order is communicated. Consequently, words are the stock and trade of lawyers.

For nonlawyers, words are a mosaic of meaning—composed of feelings, memories, facts, and promises. But to be a lawyer, one has to learn to splice words, much like physicists splice atoms, down to their most basic elements. Words have to be analyzed, charted, and made predictable in the name of law. Herein lays the problem. Words are abstractions, and the meaning of any individual word can be as elusive as the Holy Grail. To an outside observer, the crusader's pursuit is fascinating and entertaining. But to the crusader, it is both exciting and frustrating. The chase is exciting because it demands all of one's faculties. It is frustrating because, while words can be set in stone, their meanings cannot. For language and the words that comprise it to live, it must be allowed to change as society changes or it dies from irrelevance.

In *Teaching by the Case Method* (ed. C. Roland Christenson. Boston: Harvard Business School, 1987), Schon describes the issue of professionalism in law as an "urgent dilemma of rigor and relevance" (i.e., a delicate balance between deductive and inductive thinking). In the guise of legal professionalism, the rigor of deductive thinking can become a mind-numbing, nit-picking, zero-sum game. This happens when the left hemisphere of the brain is overworked and undernourished, shut off from the balancing influence of the right.

So much time and concentrated effort goes into the study and practice of law that the brain is physically changed by it. The plasticity and malleability of the brain is a new and astonishing revelation to many outside the field of neurocognition.

Although an unexpected capacity for thinking and learning in laboratory rats was reported by neurologists nearly a hundred years ago, behaviorists discredited it at the time. They argued that since a thinking brain could not be observed in action, learning must be defined as a conditioned response to a specific stimulus.

The New Model of the Human Brain

Thanks to technological developments in the last 30 years, neuroscientists have been able to peek deep into the brains of lab rats. There the production of new brain cells has been observed. What happens to the newly made cells afterward, however, is still in question. A more significant discovery for humans is that technology has also shown that the most recently evolved part of our brain, the cerebral cortex, has an amazing capacity for rewiring itself. In other words, our brains are constantly changing as a result of our individual experiences, which explains in part why no two human brains look exactly the same. It also explains why lawyers think differently from other people. Their daily experiences place heavy emphasis on deductive reasoning. Deductive reasoning depends on certain factors:

- Clearly defined goals
- Identifiable relevant details
- Specific evaluation methods

The absence of any or all of the above factors will jeopardize the effectiveness of the solution or decision. It's important to recognize that while all problems are eventually solved and all decisions are ultimately made through deductive reasoning, it isn't always the best place to start. Sometimes the goal is hard to define or the details are fuzzy, in which case inductive reasoning skills are needed.

Restoring the Balance

Inductive reasoning does not translate easily into verbal exercises because language, being abstract, allows us to skim only the surface of thought. In order to understand what is really going on in our minds, we have to slow down our thinking—observe it in action. The most reliable way of doing this is through the visual system. After all, we use the phrase "I see" to mean "I under-

stand.” Moreover, through the extraordinary process by which our brains create connections, we can develop new insights—what I call the “Ah-ha!” when everything suddenly comes together. An emotional release and a physical relaxation come with it. I don’t know why this happens, but I suspect it has something to do with our primate heritage.

Humans, like other primates, have a dominant visual cortex. Vision is our primary sense. Before we learn to speak, we’ve spent two or more years seeing. Brain scan studies indicate that visualization is the key to recognition and understanding—it is how we relate a new experience to things we already know. And this brings us back to analogical thinking.

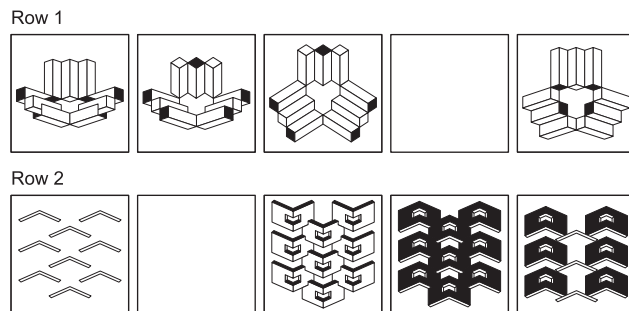
Analogical thinking is grounded in sensory experiences. It is far more concrete than rational thought. Rational thought takes more effort to maintain. It has to close the door to the messy and unpredictable turmoil that swirls about as the brain creates fantasies and futures. It tries to regulate and control in an effort to establish and maintain a current reality. The effort can be physically, emotionally, and intellectually exhausting.

Lawyers think differently because so much of the training emphasizes using a small part of the brain, the language cortex. It is no easy task to translate experience into words. Lawyers are well respected for their verbal abilities and their disciplined thought. But language by its very nature is abstract. The rules and procedures constructed through conditional and biconditional reasoning take abstraction to a higher level, further removed from direct (i.e., concrete) experience.

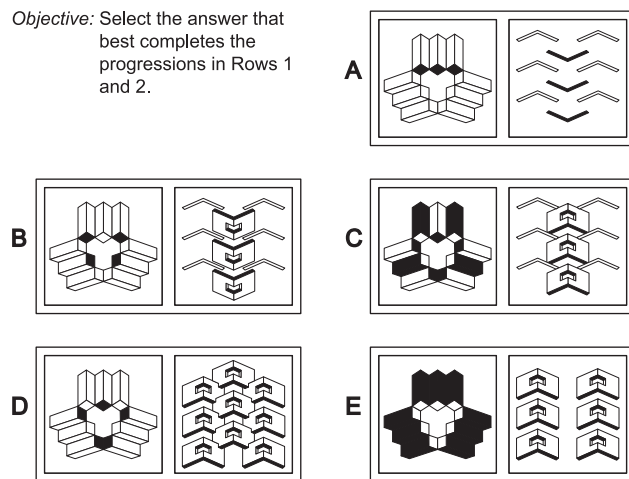
Lawyers alienate themselves when they allow their disciplined minds to shut them off from the way other people think and experience daily life, from the way they thought before they learned to be lawyers. To alleviate this effect without sacrificing respect, one has to employ the whole human brain and its ability to balance the rigor of deductive reasoning with the relevance of inductive thinking.

The accompanying visual puzzles were selected to exercise the whole brain. Solving the problems requires you to practice inductive and deductive reasoning simultaneously. Enjoy!

Double Progression Puzzle

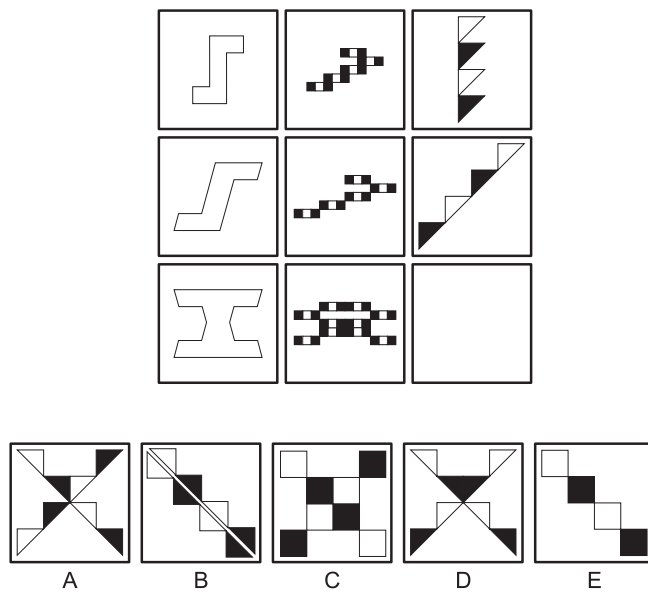


Objective: Select the answer that best completes the progressions in Rows 1 and 2.



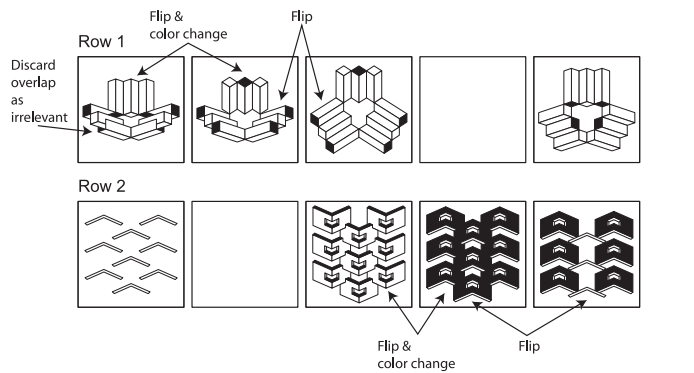
Matrix Puzzle

Objective: Select the answer that best completes the matrix.

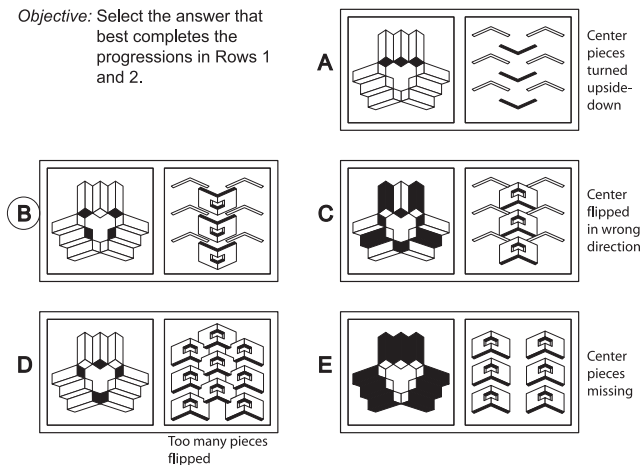


(Answers on page 30.)

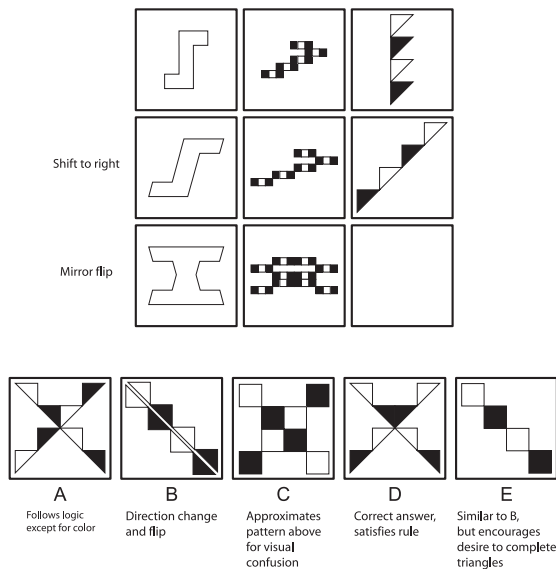
Double Progression Puzzle Answer



Objective: Select the answer that best completes the progressions in Rows 1 and 2.



Matrix Puzzle Answer



Puzzle Discussion

Both the double progression puzzle and the matrix puzzle require the mental agility to switch between inductive and deductive reasoning.

Double Progression Puzzle

To solve the double progression, you must first determine the rule embedded in each sequence. However, the empty panels force you to switch between both sequences to verify the rule.

The double progression also works as an analogy. There are several possible answers for Row 1. In order to correctly complete the sequence in Row 1, you have to use information garnered from Row 2.

Matrix Puzzle

Matrices test your ability to recognize different kinds of reasoning quickly. Some require part-whole thinking. Others use categories. The matrix given here might be considered a triple progression. The sequence reads from top to bottom in columns.

To solve this matrix, you have to establish the rule and verify it with the two completed sequences. The answer choices you're given were designed to test your understanding of the embedded rule and to challenge your visual systems.

Problem solving at work and in our personal lives requires more than just innate intelligence. It demands the ability to reflect upon and understand similar situations in the past. The greater our experiences and opportunity for rehearsal, the more accurately we can predict what is likely to happen in a new situation. Practice in solving progressions helps us strengthen our ability to establish logical sequences. Analogies help us use what we already know to make reasonable assumptions about the future. Rehearsal of these two skills in combination strengthens our tolerance for uncertainty and ambiguity and increases our adaptability. Ultimately, these skills develop mental agility and maximize intellectual potential. ■