



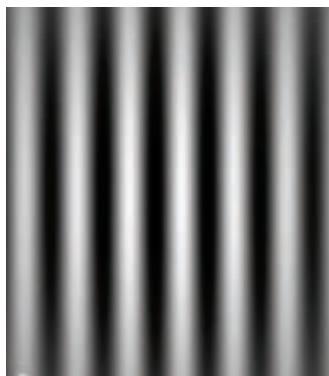
TUNING OUT: Is there a link between intelligence and the ability to suppress background motion?

What's Your Motion Quotient?

A simple exercise devised by Rochester scientists can predict your intelligence, based on an unexpected link between IQ and motion filtering.

That's according to a study led by **Duje Tadin**, associate professor of brain and cognitive sciences. The finding, reported online in the Cell Press journal *Current Biology*, indicates that people whose brains are better at automatically suppressing background motion perform better on standard measures of intelligence. The test Tadin and colleagues developed is the first purely sensory assessment to be strongly correlated with IQ and may provide a non-verbal and culturally unbiased tool for scientists seeking to understand neural processes associated with general intelligence.

In the test, people watched brief video clips of black and white bars moving across a computer screen. Their only task was to identify whether the bars



WHAT DO YOU SEE? Take the “motion quotient” test at www.rochester.edu/news/show.php?id=6422.

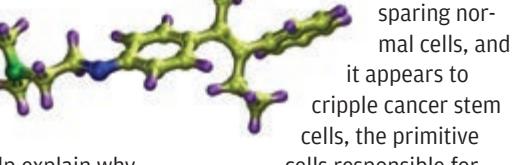
moved to the left or right. The bars were presented in three sizes, with the smallest version restricted to the central circle where human motion perception is optimal.

As expected, people with higher IQ scores were faster at catching the movement of the bars when observing the smallest image—supporting prior research showing that quick-witted people

make faster perceptual judgments and have faster reflexes. But when presented with larger images, those with higher IQ scores were slower at detecting movement—a perceptual marker for the brain's ability to suppress background motion.

Another recent study by Tadin, published in the *Journal of Neuroscience*, indicates that motion perception may give clues about the cause of autism. Children with autism see simple movement twice as quickly as other children their age.

Such heightened sensory perception in autism may help explain why some people with the disorder are painfully sensitive to noise and bright lights. It may also be linked to some of the complex social and behavioral deficits associated with autism.



—Susan Hagen

New Pathway Enhances Drug's Ability to Tame Aggressive Breast Cancer

A Medical Center team is reporting a potentially promising development for women with basal-like breast cancer, which is notoriously resistant to treatment. Published in the journal *EMBO Molecular Medicine*, the research explored a way to exploit the well-established anti-cancer drug tamoxifen's ability to attack cancer cells at more than one molecular level.

Led by doctoral student **Hsing-Yu Chen** and **Mark Noble**, professor of biomedical genetics, the Rochester team found that basal-like breast cancer escapes the initial effects of tamoxifen by relying on two proteins—one that controls the cells' receptors and a second that affects how the first protein operates.

By targeting the second protein with an experimental drug that restored normal function to the first protein, the team was able to use tamoxifen to induce cancer cell death and suppress the growth of new cancer cells. Neither drug alone had the same effect. The powerful combination may have two other important features: it selectively targets cancer cells while sparing normal cells, and

it appears to cripple cancer stem cells, the primitive cells responsible for initiating new tumors and for building the bulk of the tumor cell population.

—Leslie Orr

TARGETED: A tamoxifen breast cancer drug molecule (inset)

For Good Grades, Look Inward

Is your academic performance not what you'd like it to be? The explanation may lie in your reason for attending college in the first place. So say researchers at the Warner School, in a study published in the *Journal of College Student Development*.

Professors **Douglas Guiffrida**, **Martin Lynch**, and **Andrew Wall**, along with doctoral student **Darlene Abel**, found that

students who attend college to fulfill needs for autonomy and competence—core components of intrinsic motivation—tend to have higher grades and intentions to persist.

But they also found that students' socioeconomic status affected these relationships. Choosing to go to college to fulfill the need for autonomy was slightly more important to the

success of students of high socio-economic status than low-income students, whose motivation may be more influenced by a need to improve their financial situation.

The study also suggested that altruism—students' motivation to attend college to give back to their community—is a more powerful motivator for students of color than for white students.

This study, which tracked

motivation, college attendance, and academic outcomes of 2,500 college students attending a two-year community college or a four-year liberal arts college, is the first comprehensive study to examine such relationships using a large sample of college students across multiple institutions and to control for demographic variables.

—Theresa Danylak



HEAD COUNT: Baboons have shown they can calculate quantity by comparing approximate differences in number, much as children do.

Baboons Add It All Up

Opposing thumbs, expressive faces, and complex social systems are all shared by humans and apes. Now Rochester researchers have added another trait to the list: the ability to understand numbers.

The study—led by **Jessica**

Cantlon, assistant professor of brain and cognitive sciences, and published in the journal *Frontiers in Psychology*—helps to resolve the question of how animals understand quantity. Scientists have speculated that animals may use two different systems

for evaluating numbers: one based on keeping track of discrete objects—a skill known to be limited to about three at a time—and a second approach based on comparing the approximate differences between counts.

The baboons' choices clearly

relied on the “more than, less than” approach. Research has shown that children who haven't yet learned to count also depend on such comparisons, as do adults when estimating quantity quickly.

—Susan Hagen