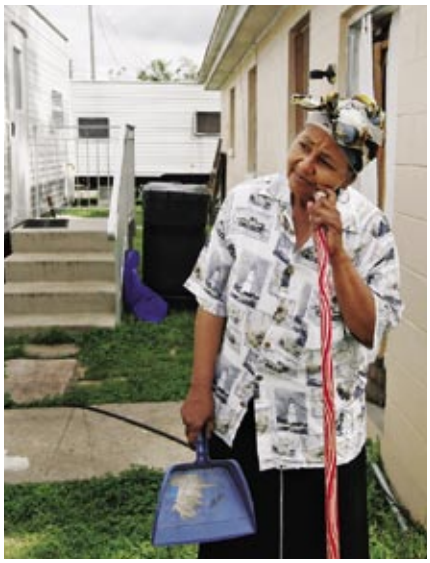


ALEX BRANDON *AP Photo*

TRAILER LIFE, such as that in New Orleans's Lower Ninth Ward, has incubated feelings of isolation and despair.

very hard. For many it took away not only their home and friends but also their social identity, job and any sense of self-sufficiency. Abramson and NCDP director Irwin Redlener note that of those they surveyed who had annual salaries of $10,000 or less before the storm, 53 percent were still out of work a year after it. Rents have doubled, though, and the FEMA trailer parks where many now indefinitely reside have proved to be pressure cookers for despair. People feel unsafe among their neighbors and isolated from the rest of the city, and the density of depression, Abramson observes, has a community-level, spiraling effect.

These assessments bear political significance because federal disaster spending is based on the assumption that once an area's infrastructure recovers, the population will recover naturally. Direct compensation for loss is one of the lowest priorities, practically nonexistent for individuals who owned no property to begin with. And the Stafford Act, which allows for short-term mental first aid after a disaster, is not designed to support long-term therapies that help to overcome persistent distress.

Mental health investigators favor a recovery policy that goes even beyond long-term counseling to support organizations and initiatives that help communities rebuild themselves. "It makes sense that if one of the problems people experience after disasters is loss of control, which is highly related to mental health problems, then having a vehicle for regaining at least some control would be helpful," Norris says. Several grassroots efforts and micro-redevelopment plans have succeeded in a few communities, but scaling them up will require broader support.

Meanwhile, experts say, sending a public message that balances hope with realistic expectations for recovery is important. People need encouragement to seek professional help such as that offered by the Red Cross Access to Care program, Speier states. And they need a reliable recovery timeline, along with simultaneous return of schools, hospitals and a justice system so that they can more confidently invest in re-establishing themselves. "It's important for people to know that time is critical," Redlener says. "Most adults will be okay once they have homes and can return to normalcy. But thousands of children at critical developmental ages will now have been rootless for upward of two years, with yet incalculable consequences."

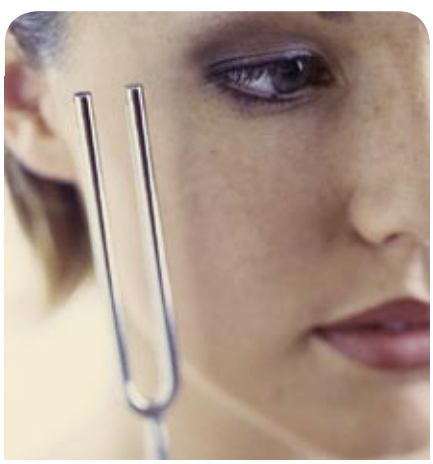
LINGUISTICS

Speaking in Tones

***Ni hao* or *bonjour:* do genes drive preference for language type?** BY CHARLES Q. CHOI

Just as humans are different genetically, so are they diverse linguistically, speaking at least 6,800 known tongues worldwide. New findings suggest genetics could explain some of the variety seen in language by, at times, leading to preferences for tones. The means by which this link works remains unclear, and some researchers dispute whether it exists.

For the most part, languages are either unambiguously tonal or not. In tone languages, such as Mandarin in China or Yoruba in West Africa, the pitch of a spoken word affects its meaning. For instance, in Mandarin, *ma* said in a high, level tone means "mother" but in a low, rising tone means "horse." In English, a word's pitch conveys emotion but often does not influence meaning. (Notable exceptions to this dichotomy include Japanese, where words can differ depending on the pitch of syllables—technically, moras—within them.)



MICHAEL POLE *Corbis*

DO-RE-MI: The right pitch is essential in tone languages, because it will affect a spoken word's meaning.

This distinction could be genetic, propose University of Edinburgh linguists Robert Ladd and Dan Dediu. The pair analyzed DNA sequences from public databases to investigate two genes linked with brain growth and development, *ASPM* and *Microcephalin*. They wanted to see how these genes correlated with 26 linguistic features, such as number of consonants, and how they varied among 49 distinct populations in the Old World.

The researchers discovered that people

who carried recently evolved forms of the genes tended to speak nontonal languages, with the newer versions of *ASPM* and *Microcephalin* appearing roughly 5,800 and 37,000 years ago, respectively. Prior studies showed that these mutations apparently do not affect intelligence, brain size or sociability. Ladd and Dediu instead suggest in the June 26 *Proceedings of the National Academy of Sciences USA* that these mutations lead to subtle differences in the cerebral cortex related to language and tone.

Ladd emphasized that there are no "genes for Chinese." As he explains it: "If you raised a boy from China in Kansas, you wouldn't find him speaking Chinese, and vice versa." Still, people might take slightly different routes to learning certain languages because of their genes. "It may even be that some find it easier to acquire tone languages than others," he adds.

Others argue that no genetic predisposition for tone languages exists. Perceptual and cognitive psychologist Diana Deutsch of the University of California, San Diego, has found that speakers of tone languages are more likely to have perfect pitch—the ability to identify any pitch heard without hearing a reference note. Her work also hints that perfect pitch is not rooted in genes—and, by extension, tone languages are not, either. Deutsch adds that the apparent link Ladd and Dediu saw "could just be a coincidence" that further research would undo, something Ladd agrees with.

Still, although perfect pitch and tone languages appear linked, "that doesn't mean that perfect pitch is necessary for tone languages," remarks Northwestern University neuroscientist Patrick Wong. Instead he suggests that if *ASPM* and *Microcephalin* do play a role with tone languages, the genes might help in hearing high and low pitches, incorporating high or low pitch into words and sentences or tracking patterns in changes of pitch. Wong finds Ladd and Dediu's work "very interesting" but "inconclusive."

Ladd notes that future studies could focus on people as they seek to learn new tone languages and see whether any mutations of *ASPM* and *Microcephalin* are linked with their level of success. Still, he thinks that even if the genes do play a role in tone and language, "these could be very subtle effects that simply do not get noticed against a background of other factors related to a person's upbringing."

Charles Q. Choi is a frequent contributor.

BUT DOES IT SOUND RIGHT? A study concludes that a genetic predisposition may exist for tone languages, such as Chinese, over non-tone tongues, such as English.

RANDY FARIS *Corbis*

SECURITY

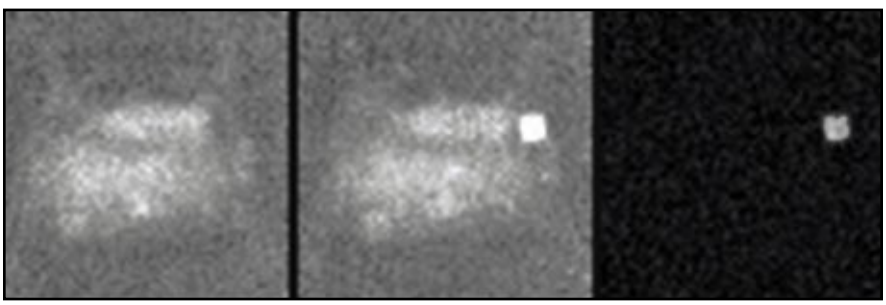
Muons for Peace

New way to spot hidden nukes gets ready to debut BY MARK WOLVERTON

The same place that gave the world the atomic bomb has now found a way to ferret out illicit nuclear material. Los Alamos National Laboratory has developed a method to search for heavy elements such as uranium via subatomic particles from space called muons. By 2008, "muon tomography" might be guarding U.S. borders.

About 10,000 muons reach every square meter of the earth's surface a minute; these charged particles form as by-products of cosmic rays colliding with molecules in the upper atmosphere. Traveling at relativistic speeds, muons can penetrate tens of meters into rocks and other matter before attenuating as a result of absorption or deflection by other atoms. The scattering is most pronounced in dense substances such as uranium and plutonium—elements with high Z (the number of protons in an atom's nucleus). "We use the fact that the scattering is sensitive to Z and particularly sensitive to the materials that you build nuclear bombs from or that you shield nuclear bombs with," explains Los Alamos's Christopher Morris, chief creator of the technology. "We measure the scattering angle for every muon, we measure the angle on the way in and the angle on the way out, and the change in the angle tells you how much material you've gone through."

After 9/11 heightened security concerns, Morris and his team realized that



MUON VISION: An automobile engine (*left*) is imaged based on the muons that pass through it. The scan reveals a lead cube hidden inside the engine (*center*). The lead becomes plainly visible when the muon data for the engine are subtracted (*right*).

CHRISTOPHER MORRIS *Los Alamos National Laboratory*