What Lies Beneath

To find out what really happened, stop listening. People's facial expressions often say far more than their words. *By Bill Glovin*

Mark Frank seems like a nice enough guy, yet his reputation as a human polygraph machine makes me uncomfortable—and skeptical. "So what am I thinking?" I ask, trying to keep my frontalis, corregator, and risorius muscles from twitching. Frank's own facial expression tells me that he's been asked the question many times before, so maybe he's really on to something.

"I have no idea," he responds, with a wry smile. "This isn't like Pinocchio; it can take three hours to systematically code one minute of behavior from videotape. In fact, it is just as important to know when you shouldn't be drawing conclusions. That's what I teach in the workshops I give at the Federal Law Enforcement Center in Georgia and elsewhere."

An associate professor of communication in New Brunswick's School of Communication, Information and Library Studies, Frank's talent for uncovering deception through expression—a focus of his nonverbal communication research—has been in increasing demand since September 11. He uses videotaped interviews to identify markers—the smiles, smirks, tics, and furrows—that convey information.

When someone is overwhelmed by happiness, for example, the zygomaticus major muscle cranks the cheeks upward. With sadness, the medial part of the frontalis muscle lifts the inner corners of the eyebrows, while the triangularis tugs down the lip corners. The orbicularis oculi narrows the eyes. "Learning to control and manage expression is something our culture teaches us," says Frank. "North American boys, for example, are taught not to cry, so their lips quiver when they're sad."

Fear is harder to detect. "I was asked to look at a videotape of an Australian making a public plea for his missing wife," says Frank. "I watched several slow motion replays to catch the micro-expression, and noticed that the inner corners of his eyebrows shot upward and together, a classic fear/distress combo." The man was later convicted of the killing.

Frank, a former high school linebacker and the son of a Buffalo police officer, first became interested in the field while working as a bouncer near the University of Buffalo campus. "I was a psychology major and after a while, I began to get a sense of who was underage or was packing weapons," he says. "It was based on intuition, but it got me wondering if there was a scientific connection."

While pursuing graduate studies at Cornell, he was referred to Paul Ekman, one of the world's foremost experts on the meaning of facial expressions. Ekman, who teaches at the University of California in San Francisco, is known for having identified at least seven emotions expressed universally: anger, contempt, disgust, fear, happiness, sadness, and surprise. "Infants convey these emotions nonverbally and so did our Neanderthal ancestors," says Frank, who later studied with Ekman for several years.

Frank, who consults for the Pentagon's

Defense Advanced Research Projects Agency, is now using a $200,000 National Science Foundation grant to help the University of California–San Diego reduce the time it takes to code behavior by having computers automatically map facial responses. Frank will record expressions of some 100 Rutgers students, who will be paid for their participation in a series of elaborate interviews.

Besides its usefulness as a law enforcement tool, his research can help clinicians better read their patients, explains Frank. "If depressed patients are trying to convince their therapist that they're not suicidal, or someone doesn't want to reveal that she has HIV, there may be signs in their facial expressions that say otherwise," he says. "So learning to take cues from someone's facial expressions can be a valuable diagnostic tool."

Swing Thing

Scores don't pose a threat to Tiger Woods? Perhaps a new putting grip is the answer.
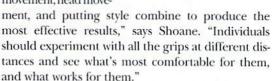
Two of golf's great statesmen, Ben Hogan and Sam Snead, probably said it best when it comes to putting. The very first words of the first chapter of Hogan's book, *Five Lessons: The Modern Fundamentals of Golf*, state, "The grip is the heartbeat of the golf swing." Snead put a professional's slant on it: "You drive for show and you putt for dough." These words of golfing wisdom begin "The Perfect Putt," George Shoane's two-minute,

Web-based video on the ScienCentral Web site (www.sciencentral.com) that explains—based on his research—why cross-hand and one-hand grips may lead to better putting.

Shoane, an avid golfer who also happens to be a professor of biomedical engineering in Rutgers' College of Engineering, placed seven novice players on a putting green covered with artificial turf. Each player wore a headset that measured head and eye movement during each stroke, and infrared sensors embedded in the platform recorded the motion of the putter head. Computer analysis of the data showed that a cross-hand or one-hand grip resulted in a truer putt from distances of three and nine feet.

His patent-pending measurement method may eventually be adapted for use as a wireless golf instruction tool. "It would allow players to assess precisely how their own eye movement, head movement, and putting style combine to produce the most effective results," says Shoane. "Individuals should experiment with all the grips at different distances and see what's most comfortable for them, and what works for them."

Shoane may be on to something. Frustrated by his putting, pro golfer Bob Estes switched to a cross-hand grip. The result? He bagged the Kemper Open, the first tournament he's won in seven years. ❏

Did you know?

❱ Treating the skin with caffeine may thwart cancer, according to researchers at the Ernest Mario School of Pharmacy. The test found that tumors shrank when caffeine and two components of green tea were topically applied to hairless mice.

❱ When large galaxies collide in what one writer has called "a cosmic demolition derby," what happens to their black holes? They fuse with a dramatic flourish, leaving behind a telltale "X" mark, reports a team of astronomers that included David Merritt, professor of physics at FAS–New Brunswick. Black holes lie at the center of virtually all galaxies.

❱ A new report from Rutgers' Center for American Women and Politics shows that while women make up 52 percent of New Jersey's population, only 19 of 120 state legislators are female—only marginally better than 25 years ago and the ninth lowest percentage in the nation. Meanwhile, just 13.4 percent of the state's mayors are women.