

**TRANCE:** In a session, Spiegel patient Zoraida Schmidt focuses

what it does makes it a legitimate option for patients whose needs have not been met by more traditional methods.

To appreciate the therapeutic potential of hypnosis, you first have to forget about things like swinging watches and hapless audience members who prance around onstage, crowing like roosters. "One of the interesting ironies about hypnosis is that old fantasy that it takes away control," says Dr. David Spiegel, professor and associate chair of psychiatry at Stanford University School of Medicine and a leading expert on the practice. "It's actually a way of enhancing people's control, of teaching them how to control aspects of their body's function and sensation that they thought they couldn't."

Hypnosis is "a form of highly focused attention," says Spiegel—an induced state of mind that enables people to alter the way they perceive and process reality. During a typical session, the doctor guides the subject into a state of receptive concentration, asking him to imagine he is in a safe and comfortable place. Once the patient is in a state of hypnosis, the practitioner makes specific suggestions—a hockey player with

# Altered States

Hypnosis can help with problems from anxiety to pain. How it works, and what it does in the brain.

BY DAVID NOONAN

**A**T 27, BETH, AN INDIANA HOUSEWIFE, came down with chronic diarrhea that plagued her for the next three years. "I knew where every bathroom in town was," she says with a laugh. But it was no joke. "I didn't really want to go out at night because it's just not fun." Doctor after doctor told her it was stress-related. She tried diet changes and medicines, but nothing helped. Then she went to see Dr. Marc Oster, a Chicago-area psychologist. After 12 sessions of hypnosis with Oster, during which Beth explored the traumatic events that preceded her illness (including her husband's agonizing two-week stay in a burn unit), the problem disappeared. Two years later Beth (who asked that her last name not be used) tried hypnosis during the birth of her second child. Three years after that she went back again, this time to deal with her fear of flying. Could there be more hypnosis in her future? "If the need

ever arises, you bet," says Beth, now 38.

Despite widely held misconceptions about hypnosis (in part because of its long history as a type of entertainment), a growing body of research supports the ancient practice as an effective tool in the treatment of a variety of problems, from anxiety to chronic pain. Today, as practitioners work to assess and refine the clinical applications of hypnosis, they are also exploring its underlying mechanisms, using state-of-the-art imaging technology to document changes in the brain that occur when someone is in a hypnotic state. This increased understanding of how hypnosis works and

back spasms was told that when his pads touched his back, the muscles relaxed—to address the problem. (This focus on a problem distinguishes hypnosis from more passive states, like meditation.) The doctor then terminates the trance and teaches the patient how to use self-hypnosis to reactivate and maintain the therapeutic effect. The benefits can last for years.

Besides pain management and stress reduction, habit control is another popular clinical application of hypnosis; it's routinely used by people who want to quit smoking. It has also been used successfully as an alternative to sedation during invasive medical procedures like angiography. And at the University of Pennsylvania School of Medicine, Dr. Peter Bloom, clinical professor of psychiatry and past president of the International Society of Hypnosis, sometimes uses it to enhance therapy sessions. "Hypnosis allows us to interact with the people who seek our care in more than one dimension," says Bloom. "It in-

**Hypnosis alters how people perceive and process reality**

volves the totality of the person. Clinically, when I get stuck, I use hypnosis and see if that gives me a different way of linking up with them." As it is practiced by medical professionals like Bloom and Spiegel, hypnosis is generally safe, though there are occasional surprises, such as the unplanned recall of a forgotten trauma (something a lay hypnotist might not handle as well as a doctor or psychologist).

Practitioners often use vivid imagery when making hypnotic suggestions. Dr. Olafur Palsson, a psychologist at the University of North Carolina, developed a detailed, seven-session hypnosis protocol for the treatment of irritable bowel syndrome, a disorder often accompanied by abdominal pain. "One of the ingredients is visualizing your stomach and your intestines and visualizing a strong protective coating being applied inside your intestines," explains Palsson. "And this special protective coating only allows pleasant sensations through, and keeps all uncomfortable sensations out. And then it is suggested that this protective coating grows stronger and thicker and harder day by day."

It's well known that some people are more responsive to hypnosis than others. Hypnotizability, experts say, is a trait, like eye color. As a rule, the more "absorbed" a person is able to get in things—movies, sunsets, daydreams—the more hypnotizable he is. (Researchers use standardized measures to screen subjects.) People who describe themselves as more trusting of others tend to be more hypnotizable, says Spiegel, while those who are very logical and never take anything at face value tend to be less hypnotizable.

Several studies using positron emission tomography (PET) have looked at what goes on in the brain during hypnosis. In one, hypnotized subjects had their hands immersed in "painfully hot" water but were told it was comfortably warm. This not only altered their perception of the pain but also altered blood flow in pain-related parts of the brain. In another study, highly hypnotizable people were shown a black-and-white pattern and asked to see color. The results: the regions of the brain normally activated during color perception were activated in the hypnotized subjects. "It's not just a fantasy," says Spiegel. "It's not just telling people things because that's what you think they want to hear. If you think you are seeing color, you actually see it, and your brain acts as though it's seeing it." It's easy to see why, in the field of hypnosis these days, nobody is getting sleepy. ■

# This Is Serious Fun

Can videogames equipped with neurofeedback help kids deal with their learning disabilities?

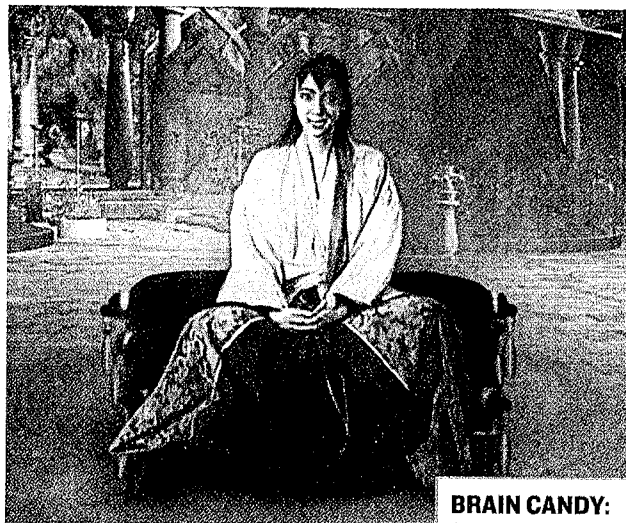
BY N'GAI CROAL

**A** STITCH IN TIME SAVES nine. An apple a day keeps the doctor away. And videogames will rot your brain. Conventional wisdom? Maybe, but psychologist Dominic Greco is determined to prove that at least one of those sayings is not true. Greco, the 52-year-old founder of CyberLearning Technology, uses neurofeedback-enhanced versions of off-the-shelf videogames like Ratchet & Clank to help treat children and adolescents with attention-deficit disorder or cognitive-processing difficulties. If that sounds like futuristic, space-age technology, you're not

or adolescent operates a regular videogame console like the PlayStation 2, but with a controller that has been modified by CyberLearning Technology. If the player remains focused while speeding through the streets of Tokyo in a racing game like Gran Turismo 3: A-Spec, he or she will be able to drive unimpeded. But the moment the youngster's attention wanders, the system steadily reduces the top speed available to the player, causes the controller to rumble and produces atonal sounds, letting the child know that he or she must refocus. Once the kid does, the sounds disappear, the rumble goes away and the child can once again achieve top speed. "We're exercising the

brain to a higher level of processing and attention," says Greco, who's been using neurofeedback to work with children since 1990. Though neurofeedback hasn't been studied as extensively as drug therapy, it has fewer side effects, and many families swear by it. Dr. Ali Hashemi of the California-based Attention and Achievement Center cautions that while the principles of neurofeedback are well established, as yet there are no peer-reviewed studies of Greco's methods (though one is expected by the year-end).

Adults can benefit from neurofeedback as well. The Wild Divine Project has released a CD-ROM for Mac and PC called Journey to the Wild



**BRAIN CANDY:**  
A scene from Journey to the Wild Divine

far off; CyberLearning Technology has built its system, dubbed S.M.A.R.T. Brain Games, around a neurofeedback patent it obtained exclusively from NASA.

Here's how S.M.A.R.T. Brain Games work. A normal human brain, when awake and focused on an activity, produces a lot of fast brain waves. But people with cognitive-processing or learning disabilities produce large amounts of slower brain waves—like the ones generated when we're sleeping or daydreaming. That makes staying focused extremely difficult.

S.M.A.R.T. Brain Games use a specially designed headgear, with built-in sensors, to monitor the player's brain waves. The child

Divine, which uses sensors attached to the fingers to monitor skin conductance and heart-rate variability via the computer's USB port. The story-based game teaches things ranging from yogic breathing to meditation through lush visuals that respond to your actions, like lighting a virtual fire by exhaling calmly and smoothly. "I was always frustrated by how boring biofeedback was," says Corwin Bell, Wild Divine's 40-year-old designer. "Raise a bar, make a face smile. It wasn't very entertaining. The challenge for me and my team was to bring in a visual metaphor." Mission accomplished. ■