Folk Illusions

What schoolyard tricks reveal about young minds

Our son, Iago, currently in fourth grade at a public school in Brooklyn, N.Y., learned a new game at recess recently. One evening, after entertaining the family with his ever expanding repertoire of knock-knock jokes, he turned to one of us (Susana) and pointed his index finger at her arm, stopping just half an inch from her skin. She looked at her arm, intrigued, and then at Iago.

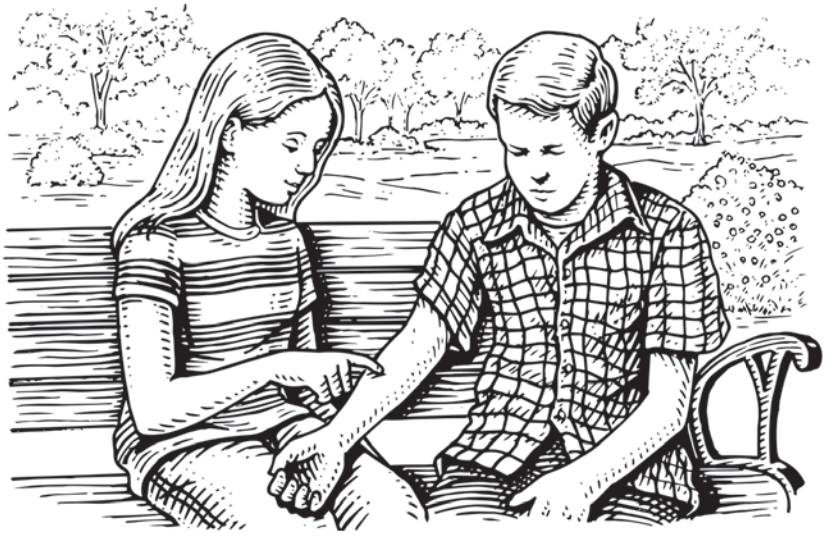
"Am I touching you?" he asked.

"No," she replied. His finger was clearly not in contact with her arm.

"Look!" he said, delighted, pointing to his other hand, which was resting on her knee.

Because Susana was so focused on her arm, she had failed to notice Iago touching a different part of her body. The trick reminded us of the tactics used by theatrical pickpockets such as Apollo Robbins, with whom we collaborated on a study of misdirection in magic. To steal spectators' belongings during his act, Apollo gets people to pay attention to a specific location (say, their front pocket) while he pilfers an object from somewhere else (such as a watch from their wrist). Iago's version was far less sophisticated, but it demonstrated the same basic principle: the best way to divert someone's attention from an object or place is to get him or her to focus elsewhere.

Iago's prank is an example of a novel but quickly growing genre of perceptual and cognitive ruses that Indiana University Bloomington folklorist K. Brandon Barker and University of Louisiana at Lafayette English professor Claiborne Rice have dubbed "folk illusions." These playful misperceptions are shared and taught, from child to child, generation after generation, at playgrounds, schoolyards, sleepovers and summer camps. Every reader will remember at least a few such tricks from his or her childhood. Some of the earliest records date back to the 1600s (see, for example, the famous diary of English Parliamentarian and naval administrator Samuel Pepys). Today's schoolchildren still play very similar—even identical—games.



ILLUSTRATIONS BY STEVEN HARRINGTON; SEAN MCCABE (*Martinez-Conde and Macknik*)

MISSING THE BEND

Recently neuropsychologist Peter Brugger and his then student Rebekka Meier of University Hospital Zurich investigated a curious game children play at Swiss playgrounds. Brugger first learned about it in 2002 from his daughter, Hazel, who was nine years old at the time. One kid—"the director," in Barker and Rice's parlance—asks a friend, "the actor," to close his or her eyes and extend one arm with the palm up. The director slowly slides his or her finger from the wrist toward the crook of the actor's elbow. The actor, with eyes still closed, shouts, "Stop!" when he or she feels that the director's finger has reached the crook. On opening his or her eyes, the actor sees the error: many people will say stop one inch or more short of the bend in their arm.

Both actor and director delight in the mistake—a reaction that is commonplace with these games, Barker and Rice say: "There are many questions left around folk illusions that we hope to find answers for. But one thing that we are absolutely certain of is that the kids love to play them, and that's because they have so much fun."

Brugger and Meier tested this elbow illusion in 90 adult participants and found that it was stronger in the nondominant arm and more striking in men (supporting previous observations that women have greater sensitivity to touch). They proposed that the phenomenon might be partially explained by the late firing, or "afterdischarge," of cortical somatosensory neurons in response to specific signals from skin mechanoreceptors that are driven by slow-moving tactile stimuli.

BY SUSANA MARTINEZ-CONDE AND STEPHEN L. MACKNIK

Susana Martinez-Conde and Stephen L. Macknik are professors of ophthalmology, neurology, physiology and pharmacology at SUNY Downstate Medical Center in Brooklyn, N.Y. They are the authors of *Sleights of Mind,* with Sandra Blakeslee, winner of a Prisma Prize for best science book of the year (http://sleightsofmind.com).

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Just as brothers Jacob and Wilhelm Grimm—recognized by some academics as the first folklorists—collected children's tales in 19th-century Germany, Barker and Rice have been compiling contemporary folk illusions in the U.S. Their collection is expanding through the painstaking process of recording children's reports and adult recollections and making direct observations of kids' interactions. Barker and Rice's future research plans include documenting folk illusions from non-Western cultures.

So far Barker and Rice have identified more than 70 types of folk illusions, starting with games such as "steal your nose" among toddlers and progressing to more sophisticated tricks throughout the school years into adulthood. Their categorization makes it clear that age affects the games we play. And this observation in turn offers a fascinating window into the brain's perceptions and thinking processes during development.

Readers are welcome to share their childhood games with Barker and Rice at shareyourillusions@folkillusions.org. Here we review some historical and current folk illusions and explain their neural bases. **M**

FLOATING ARMS

One of the most popular illusions from child lore is the "floating arms" trick. In one common variant, the child director stands behind another child, the actor, holding the actor's arms close to the sides of his or her body while the actor tries to lift them up. The two remain at odds—one pushing up and the other down—for approximately 30 seconds. And when the director releases his or her hold, the actor's arms appear to float up by themselves, without the actor's conscious intent.

At work is the Kohnstamm effect, named after the German neurologist who first described it in 1915. Scientists believe it results from neural aftereffects that follow sustained muscle contractions. The trick most likely invokes the brain's motor and somatosensory areas, as well as the cerebellum (a hub for the coordination of movement).

Children will often incorporate complex narratives to go along with the illusion. In one of Barker's favorites, the director turns an imaginary crank in front of the actor's chest as his or her arms start to rise, declaring that the actor is Frankenstein's monster.

CHURCH BELLS

Barker and Rice found an early reference to this game—still played today—in a text from the early 1600s. Different variants involve either a wire coat hanger or a metal oven rack, which produces a more powerful effect. To play, cut two pieces of string, tie them to the metal and then wrap the loose string ends several times around your index fingers. Put your index fingers in your ears and have a partner strike the rack. You will hear the sound of a church bell. The illusion relies on the mechanical transmission of the vibration from the metal to the strings, then to the hands and skull bones, and finally to the fluid inside the cochlea in the inner ear. "Even when you anticipate that it is going to work," Rice says, "it is still so surprising when it does happen."

MORE TO EXPLORE

- **Folk Illusions: An Unrecognized Genre of Folklore.** K. Brandon Barker and Claiborne Rice in *Journal of American Folklore,* Vol. 125, No. 498, pages 444–473; Fall 2012.
- **A New Illusion at Your Elbow.** Peter Brugger and Rebekka Meier in *Perception,* Vol. 44, No. 2, pages 219–221; February 2015.
- **Folk Illusions and the Social Activation of Embodiment: Ping Pong, Olive Juice, and Elephant Shoes.** K. B. Barker and C. Rice in *Journal of Folklore Research,* Vol. 53, No. 2, pages 63–85; May/August 2016.