So close, but so far

The study of virtual twins presents a telling piece of evidence in the nature-versus-nurture debate

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As sisters only four months apart, Julie and Sara Curry grew up being peppered with questions from confused classmates. Your mom was in labor for four months? asked one friend, said Sara, 19. How is it possible? others inquired.

The Curry sisters, college sophomores who live with their parents in this high desert town on the outskirts of San Diego, are what Nancy L. Segal, a psychologist who is researching behavioral differences among twins, refers to as virtual twins. By her definition, virtual twins are unrelated children born within nine months of each other who enter a family, through birth or adoption, in the first year of life. Since 1991, Segal has been studying 137 such sets of siblings, whose average age difference is three months.

As scientific subjects, virtual twins provide a rich pool of material for researchers tackling the nature-versus-nurture question. In Segal's studies, as in so many involving biological twins, it seems that nature is winning.

Raised together essentially from birth, or at least since infancy, virtual twins may be genetic strangers, but they share an environment from an early point in life.

A twin herself, Segal runs the Twin Studies Center at California State University, Fullerton, and is the author of two books on twins. She said her work has shown that virtual twins have less in common in terms of behavior, intelligence and decision-making than fraternal or identical twins, including those reared apart, or even biological siblings several years apart in age. Her research has appeared in publications like the *Journal of Educational Psychology* over the last few years.

"I expected the virtual twins to be more alike than they were because they had been raised together all their lives," said Segal, who has also studied hundreds of pairs of fraternal and identical twins, including dozens reared apart. "Yet they were so much less alike. It gives us another piece of evidence in the whole nature-versus-nurture puzzle."

While it is difficult to quantify the phenomenon, researchers say that virtual twins are an increasingly common result of Americans having children later in life, facing fertility issues and forming families through a patchwork of channels: adoptions, surrogate births, natural pregnancies and fertility treatments, which can lead to multiple births. Many parents, having struggled with infertility for years, pursue several avenues at once to increase their chances of having at least one child. If two adoptions or an adoption and a pregnancy work out at about the same time, the stage is set for virtual twins.

Peggi Ignagni of Oberlin, Ohio, had been trying to become pregnant for nine years when she and her husband, Tony, applied for a foster-care license, hoping they could adopt an infant after taking him into foster care. They got Nickholas when he was 3 days old but decided to proceed with in vitro fertilization, fearing that they might not be able to keep the boy. The fertility treatment worked, and Ignagni became pregnant with

triplets who were born eight months after Nickholas. She and her husband, who owns a medical device company, now have four 6-year-olds. "At least they were all potty-trained within the same week," she said.

In the case of the Curry sisters, Sara was adopted at birth by Deborah and Dave Curry, who are both retired from the Navy. The couple had tried having children for almost four years before they arranged for a private adoption. Deborah Curry became pregnant with Julie a month after Sara's birth mother chose them as parents. When they left the hospital with Sara, they were stopped by a security guard and asked to explain why they were leaving with a newborn when Deborah Curry was obviously still pregnant.

The Currys — he is one of six siblings, she is one of 11 — say the differences between Julie and Sara are striking. They saw fewer differences between themselves and their own siblings, they said. Moreover, the girls became more different as they grew older and were less influenced by their parents, a conclusion that Segal has drawn through her research on other virtual twins as well. Their genes came to play a larger role in determining their aptitudes and personality traits, Segal said, adding that the experiences of other virtual twins she has studied provide more evidence of that.

Sara loves horror films but hates extreme sports; Julie likes feel-good films but loves jumping out of planes with a parachute. "I'll jump off a cliff but I won't watch *Saw*," Julie said, referring to the gore-filled movie.

Sara goes to church; Julie doesn't. Sara wears six earrings on each ear; Julie rarely wears jewelry. Sara is chatty, Julie quiet. Sara wears glasses, Julie contacts. Sara dresses up; Julie generally dresses down.

The dissimilarities may sound like those that occur among any siblings, but their parents and Segal, who has studied the sisters at two different times, say the contrast between them seems to go much deeper. In fact, she said the differences she found in general intelligence between the sisters were greater than you would find in most biological siblings, even those of very different ages.

Segal's research typically involves interviewing virtual twins when they are at least 4 years old, giving them intelligence tests and having their parents and teachers fill out extensive questionnaires on behavior, their relationship with their sibling and their school, medical and dental histories. So far she has conducted follow-up interviews with 42 of the 137 pairs, including Sara and Julie; there is no age limit for the subjects she is studying.

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Unlike some other virtual twins, Sara and Julie were not dressed alike or treated as twins in school. "They are totally different," Dave Curry said. "They offset each other." As the family sat around their dining room table on a recent afternoon, Dave Curry turned to his daughters and said: "It has to be more nature. You grew up so close, you were together 24-7." He turned to Sara and said, "She's a stabilizer to your drama." And to Julie, "She brings excitement to you."

"Yeah," Julie said to her sister, "you bring me out of my shell." Some virtual twins in the study, however, have been deliberately raised as twins from birth. Julie Dykstra, a former nurse who lives in Belmont, Michigan, had two adoptions come through within the same week. Her sons, now 6, were due on May 1 and May 3. Each was born 3.7kg and 53cm long, she said, 10 days apart. "I never felt like I didn't have twins," she said. "I felt like I was immersed in it."

They have grown up feeling like twins, and the family has told their school that they are twins.

"They have twin language," Dykstra said. "They know what the other is thinking and going to say before he says it. They met at 13 days and 3 days old."

Segal said that while "genetics do not tell the whole story," even if parents treat their virtual twins as biological twins or if the children show similarities early in life, her research has found that environment still has "minimal or no effect" on them in terms of behavior and intelligence. Virtual twins can seem very similar in their early years, she said, but in the long term a shared environment is not "going to have a lasting impact."

Dykstra and her husband, Todd, a pastor at Maranatha Bible Church, later adopted another set of virtual twins, two girls who are 20 days apart and are now 2. One was adopted from China and did not join the family until she was 10 months old. Dykstra does not feel the girls are twins because one had been in an orphanage in China and came into the family so much later than the other. She added that the girls are still young. Six months ago the couple adopted another girl at birth, the biological sibling of one of their adopted daughters, and Dykstra said she was excited to find out how the three sisters will be different. "We are like a little petri dish," she said.

Some critics and adoption agencies say that having virtual twins (sometimes called pseudo twins or artificial twins) should be avoided by parents when possible, so that each child receives adequate parental attention. Some say that parents are not being truthful or fair when they attempt

to arrange more than one adoption from birth mothers who might not choose them if they knew another infant would be brought into the home within the first year.

"People need to be very well counseled," said Joyce Maguire Pavao, the chief executive and founder of the Center for Family Connections in Cambridge, Massachusetts, which provides counseling and other services to what the center calls blended families.

"Adoption should be about finding families for children, not about finding children for families," she said. "In many cases parents are doing this without understanding what the ramifications are. I think it's fine to do it if people are well aware that doing it may be very difficult."

But Segal said that in most cases fate, more than parents' choices, leads to instances of virtual twins, and that those parents cannot be faulted for covering as many bases as possible, given that so much can go wrong with high-risk pregnancies and adoptions. In her work, she said, she found that parents were happy to have children close in age because it offered the siblings companionship.

Several major twin studies over the last 20 years, particularly those following twins raised by different families, have provided what scientists say is clear evidence that genetics play a greater role than environment in intelligence and a range of personality traits. Segal's research, believed to be the first to examine virtual twins as a subset of the twin population, has bolstered the prevailing view through another lens.

Over the last 17 years, Segal and her researchers have tested verbal and nonverbal abilities in intelligence tests of identical, fraternal and virtual twins. More recently they have conducted other tests that evaluate how subjects make decisions, asking them to answer questions based on how they thought they and their sibling would answer together. She found striking differences among the virtual twins. Among the questions: name a book, a movie and an ice cream flavor, and if your twin was lost in the park, where would you look? That research is scheduled for publication this fall in *Personality and Individual Differences*, a psychological journal. Segal has found that identical twins were the most alike in their thinking, fraternal twins somewhat less so, and virtual twins strikingly different. When it comes to intelligence, for example, her research has found that only 25 percent of the differences between twins — virtual, fraternal or identical — can be accounted for by their environment, 75 percent by genetics.

Top: Peggi and Tony Ignagni with their children, from right, Vincenzo, Nickholas, Blaise and Noelle, wandering in the woods in Oberlin, Ohio. The Ignagnis adopted Nickholas as an infant, one month before getting pregnant with triplets.

Above: Julie, left, and Sara Curry in Ramona, California. The Curry sisters, who are the same age but not genetically related, are what psychologist Nancy L. Segal refers to as virtual twins.

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