

DID YOU KNOW?

There is a third type of twin besides identical and fraternal? Remember that identical twins (monozygotic or MZ) form when a single fertilized egg splits into two. This pair has identical genes. Fraternal twins (dizygotic or DZ) result from two eggs fertilized by separate sperm and share 50% of their genes, the same as singleton siblings.



1997 Family Photo

Geneticists have identified a rare third type called polar body twinning (also known as hybrid or half-identical) that occurs when an unfertilized egg splits into two parts that are then fertilized by different sperm. Since the twins share one-half of their gene set (from their mother), their DNA is 75% alike. Because the father's DNA determines gender, the twins can be either same-sex or male/female.

Higher multiples can be any combination of MZ and DZ. For example, it is possible to have identical triplets where one embryo splits and one of these splits again. Also, triplets would result if one of a pair of DZ embryos split to form MZ twins.

President George Bush is the father of twin girls. First Twins Jenna and Barbara Bush attend the University of Texas and Yale University, respectively.

Important Developments in Genetics

1838-1839
Cells are the basis of all living things.
Matthias Schleiden (1804-1881)[pic in Britannica.com], German botanist and master microscopist, observed that all plants are composed of cells. Theodor Schwann [pic, same place] (1810-1882) extended cell theory to animals, stating that all living things are composed of cells. The history of cell theory is the history of the actual observation of cells, and this was not possible until the invention of the microscope, announced by Galileo in 1610. The English scientist Robert Hooke (1635-1703) from his microscopic observations of cork coined the term cell.

Who invented Twin Studies?
In the 5th Century, St. Augustine used his knowledge of twins to debunk astrology. In his *City of God* he said that twins usually had very similar horoscopes because they were born so close together but often had different life histories. It seems as if Augustine did not fully appreciate the difference between identical and fraternal twins.

In the late 19th century, Sir Francis Galton was one of the first to suggest that twins might serve as a method for determining the contributions of hereditary and upbringing. The remarkable thing is that Galton understood how identical and non-identical twins were produced long before the days of genetic testing. In *Inquiries into Human Faculty and its Development* (1883) he writes, "I [was] seeking for some new method by which it would be possible to weigh in just scales the effects of Nature and Nurture, and to ascertain their respective shares in framing the disposition and intellectual ability of men. The life-history of twins supplies what I wanted."

His method investigated how environmental influences divide twins into two groups: those who were similar when young and grew up to become dissimilar, and those who were unlike when young and became more and more alike. He likened the life histories of (identical) twins to the journey of two sticks dropped into a creek at the same time. First one is ahead, then the other, pushed around in the chances and swirls of life, yet finally reaching the end close to each other.

Address Changes/Questions/Comments

Please let us know if your address or phone number has changed or will change soon. This will help us get information to you more efficiently. Write, call our toll-free number or e-mail us (matr@vcu.edu) with your updates and comments.



TWO MULTIPLES DAYS IN 2003!!!
Paramount's Kings Dominion AND Carowinds!

The mid-Atlantic Twin Registry is offering again this year two Multples Days this summer: our **10th Annual Multiples Day at Paramount's King's Dominion** in Virginia and the **2nd Annual Multiples Day at Paramount's Carowinds** in North Carolina. Twins and their families can get discount tickets to the parks on these days. Representatives for the MATR will again be at the picnics at both parks to meet twins and offer free information about the Registry and books about twins at discounted prices.

The 10th Annual Multiples Day at King's Dominion in Richmond will be held Saturday **June 19th**. The 2nd Annual Multiples Day will be held Saturday **July 17th**.

Be sure to mention when you order by phone or mail that you want the "Multiples Family Day Ticket"! Below is a table with information about each event. So mark your calendars, order your tickets **in advance**, and be there to meet your old friends and make new ones.

Place	10th Annual Multiples Day Paramount's Kings Dominion, Doswell, VA (about 20 miles north of Richmond, VA)	2nd Annual Multiples Day Paramount's Carowinds, Charlotte, NC (near the NC/SC border)
Date	Saturday, June 19th, 2004	Saturday, July 17th, 2004
Time	10:30AM-10:00 PM	10:00 AM-10:00 PM
Picnic hours	1:30-2:30 PM	1:30 PM-2:30 PM
Park entry cost	\$24.00 ages 3 and up (children 0-2 free)	\$24.00 ages 3 and up (children 0-2 free)
Parking fee	\$8.00 per vehicle	\$8.00 per vehicle
Picnic Cost	\$10.50 ages 7 and up \$5.75 ages 3-6 (children 0-2 free)	\$10.50 ages 7 and up \$5.75 ages 3-6 (children 0-2 free)
Information	(804) 876-5561/5240	1-800-888-4386, toll free
Order tickets by	June 3, 2004	July 1, 2004
Order methods	Phone orders only	Phone orders only

Please ask about the Multiples Family Day Tickets.
Tickets cannot be purchased the day of the event, phone orders only.



MID-ATLANTIC *twin* REGISTRY

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Twin Matters

A Family Newsletter from the Mid-Atlantic Twin Registry Volume X



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- Carowinds/Kings Dominion Annual Multiples Day
- Famous Twins
- Important Developments in Genetics

A Message From the Directors


This past year brought changes to the MATR. Dr. Lenn Murrelle, who helped found the North Carolina Twin Registry and was a MATR Co-Director for 5 years, moved to a job in private industry in July 2002. We wish Lenn the best, and we are pleased to welcome Dr. Lindon Eaves as the new MATR Co-Director.

A native of England, Dr. Eaves is a Distinguished Professor in VCU's Departments of Human Genetics and Psychology. He received a bachelor's degree in Genetics, a Ph.D. in Behavioral Genetics, and a D.Sc. in Genetics, all from the University of Birmingham in England. He also received a master's degree in psychology from University of Oxford. Dr. Eaves joined Virginia Commonwealth University's Department of Human Genetics in 1981. In the 1980s and 1990s, Dr. Eaves directed the Virginia Twin Study for Adolescent Behavioral Development, a landmark study of some 1,400 families of twins. This study has provided valuable information on factors that influence behavioral problems and healthy development in youth. Dr. Eaves also is internationally respected for his work to develop new methods for analyzing data collected from twins.

Dr. Eaves is also an ordained Episcopal priest. When he is not busy with research, he is serving as priest-in-residence at St. Thomas' Episcopal Church in Richmond, Virginia. Please join us in welcoming Dr. Eaves, the new Co-Director of the MATR!

Sincerely,


Lindon Eaves, PhD


Linda Corey, PhD



Two Multiples' Days—Kings Dominion and Carowinds!

Last year Saturday, July 19th, we held the first ever Annual Multiples Day in Charlotte, North Carolina at Paramount's Carowinds. The day was definitely a success and all had a great time. We got to know the park staff, and the local newspapers carried the story of this exciting new event. Even the afternoon rain did not spoil the fun as twins from all over the region gathered to spend the day together making new friends and enjoying the rides, games, and great food. We were glad to meet every one of you and look forward to next year as we continue this new annual tradition.

We would not want to leave out our 9th Annual Multiples Day at King's Dominion on Saturday, June 21st. It was better than ever with both new faces and some more familiar ones joining in the fun. At both parks we held the traditional twins contests. Categories included: smallest birth weight babies, largest birth weight babies, who traveled the farthest distance

to the park, and the youngest/oldest set of twins present with prizes for all. Book sales about twins were strong, and people liked the event memento—a waterproof money holder (which proved useful when the day got a little soggy in North Carolina!).

At King's Dominion, we also had our meet-and-greet. This is something new we like to do to let the twins get together and take pictures, if they were not able to make it to the picnic. This year we had several sets of twins show up to socialize at the Eiffel Tower and get their pictures taken with park characters.

We had lots of great pictures taken at both events. You will be glad to see that the new King's Dominion photographs have made it onto the website. The Carowinds' photos will soon follow, and the twin pictures you see in the newsletter are from that fun day.

Research Updates

Influences on the Use of Legal and Illegal Substances

For the past several years, Dr. Kenneth Kendler and Dr. Carol Prescott, co-directors of the Stress and Coping Twin Project, have been conducting a study about influences on the use and abuse of substances such as caffeine, nicotine, alcohol, as well as other drugs, both prescription and recreational.

With nearly 1800 male twins, including approximately 750 pairs, now interviewed, the data collection phase of the study is ending. The next step analyzes the data to address a variety of questions: (1) Is drug use mainly due to genetic or to environmental influences? (2) How do environmental factors such as availability of drugs and peer drug use influence the decision to use, or not to use, substances? (3) Is the combination of genetic and environmental causes of drug use the same or different from one drug to another? (4) Do genes influence the use of some drugs more than others? The researchers hope that answers to these questions will help the understanding and prevention of drug abuse.

Environmental Influences on Depression, Anxiety, and Alcohol Use

Dr. Prescott's and Dr. Kendler's study about the environmental influences on depression, anxiety, and alcohol use continues. This study builds upon the earlier work of the Stress and Coping Twin Project by focusing on life experiences and their effects. Twins contacted for this study have all previously participated in the Stress and Coping Project and so will be familiar with the interview format. New in this study, however, are measures of memory, attention, information processing, and personality. The researchers are including these areas to discover whether they contribute to the development of depression, anxiety, and alcohol use.

Neuropsychological Assessments for Temperament

A major question of the Stress and Coping Twin Project asked why people differ in their vulnerability to anxiety and depression. Dr. Kendler's latest project uses methods from a new scientific field called affective neuroscience (AN), which studies the brain pathways that influence depression and anxiety. Rather than interviewing people about their experiences, AN measures emotions directly by carefully recording people's facial expressions and reactions to unpleasant events, such as a loud noise. This study seeks to identify the brain functions through which genetic factors influence temperament and emotions. Researchers will ask participating twins to perform a variety of tasks, some on computer and some with paper and pencil.

Young Adult Follow-Up Study (YAFU)

In 1992, Dr. Lindon Eaves and Dr. Judy Silberg began the Virginia Twin Study of Adolescent Behavior Development (VTSABD). With the help of over 2,800 female and male twins (8-17 years old) and their parents, the researchers tried to sort out the relative contributions of genes and the environment to problems like anxiety and depression, eating disorders, substance abuse, conduct disorder, and ADHD. One conclusion drawn from the VTSABD: hereditary factors play a critical role in nearly all forms of problems in childhood and adolescence.

The research continues as these same children (now 18-25 years old) make the transition from late adolescence to young adulthood. The Young Adult Follow-Up Study (YAFU) will try to find answers to some important questions: 1) What are the best childhood predictors for healthy functioning in young adulthood? 2) Who is the best person to ask about a child's

behavior for predicting later outcomes — the parents, the child, and/or the teacher? 3) Is the expression of behavioral problems at different points in development due to a common set of genes? 4) Are there different genetic and environmental pathways to problems in young adulthood?

Children of Twins Study (COT)

Traditional twin studies have provided us with a powerful tool for separating genetic and environmental influences on psychological and behavioral traits. This new study, however, conducted by Dr. Judy Silberg and Dr. Lindon Eaves goes a step further by including the offspring of twins so researchers can explore the multiple interactions of genes and environment across generations. The first phase of the project, the phone interview, is almost complete, and the second phase, the in-home interview, is beginning now.

The COT began in September 2002 and will take five years to finish, including by its completion nearly 2,400 families and over 10,000 interviews. This large sample size makes this study the first of its kind, and researchers are excited about the prospects of further clarifying how genes and the family environment affect our children—ultimately enabling us to make better parenting choices

Puerto Rican Infant and Neonatal Twin Study (PRINTS)

We are working closely with researchers at the University of Puerto Rico to collect data about temperament, development, and health in very young twins. We hope to use the information gathered from the survey to discover how genes and the environment influence behavioral traits in the very young. The Puerto Rican component has been underway for sometime, and now a comparable study is being launched here on the mainland with the help of MATR

participants.

Puerto Rico has proved ideal for several reasons. The island is small and well populated, and with the help of the Puerto Rico Department of Health, researchers were able to contact families with new twins just a few months after their birth. Participation was excellent—865 twin pairs out of 1079 born in 2001 and 2002 (80%). Findings thus far strongly suggest that genetic influences contribute significantly to temperament difference, even in the first year of life.



Keep those pictures and stories coming!

You're Right! You Did Miss a Newsletter

The fall issue of *Twin Matters* was not sent out before Christmas, and we apologize.

We were very busy with these continuing studies, and the newsletter became so delayed that we decided to postpone its release until now. We will be back on our regular newsletter production schedule when your next issue of *Twin Matters* arrives this autumn.

