



# WISCONSIN TWIN RESEARCH NEWSLETTER



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## Spotlight on Research Genetic and Environmental Influences on Stress Hormone Levels

Studying twins allows us to estimate genetic and environmental influences on a given behavioral or physiological trait. Typically, variation of a trait is attributed to three possible sources: variation in genetic factors, variation in shared family environment, and variation in unique or non-shared environment. By studying twins, we can begin to tease apart the role that these three sources of variation play in contributing to the individual differences in a trait. From a genetic standpoint, identical twins are clones of each other. They share all the same genes. Fraternal twins, on the other hand, are as alike as any other sibling pair; on average, they share about half the same genes. Both types of twins are assumed to share family environment to the same degree. That is, we don't expect identical twins to be treated more alike than fraternal twins. If identical twin pairs are more similar on a trait than fraternal twin pairs, we conclude that genetic factors play a big role in the development of the trait. On the other hand, if identical twin pairs and fraternal twin pairs are similar to the same degree, we conclude that shared environment plays a bigger role in the development of the trait. The extent to which identical twins are not alike is attributed to non-shared environment. To illustrate the use of a twin design to estimate genetic and environmental influences, we will use levels of the stress hormone cortisol as our physiological trait of measure.

One of the primary physiological systems involved in stress reactivity is the hypothalamic pituitary adrenocortical (HPA) system. Cortisol is the primary steroid hormone produced by the HPA system. Cortisol is one of the few hormones required for many life sustaining activities. In response to stressful environmental stimuli the body requires increased HPA activity to ensure survival by increasing the availability of energy from glucose metabolism.

Although vital in response to stressful environmental stimuli, cortisol is also secreted under normal, non-stressed conditions. Such activity is referred to as basal cortisol activity. Basal activity has been shown to follow a circadian rhythm with the highest levels appearing around the time of awakening and then dropping throughout the day.

Research has demonstrated that genetic and environmental influences on basal cortisol activity appear to vary throughout the day as well. A few studies have shown that morning basal cortisol levels appear to be under a considerable amount of genetic influence. However, little work has been done examining genetic and environmental influences on basal cortisol levels later in the day. Utilizing data from the Wisconsin Twin Project, we were able to estimate genetic and environmental influences on the variation in afternoon and evening basal cortisol levels. Salivary cortisol samples were collected in the late afternoon and before bedtime over three days from parents and twins. Cortisol values were averaged across days.

We found no evidence for genetic influence on the variation in late afternoon cortisol levels; however, we found evidence for modest genetic influence and some shared environmental influence on the variation in evening cortisol levels. Taken together with evidence from previous research, results indicate that genes have more influence on cortisol at the beginning and end of the day whereas the environment has more influence on late afternoon cortisol. Daily stress may be influencing the variance found in late afternoon cortisol levels while morning and evening cortisol levels are less influenced by daily stress. Perhaps the stability of morning and evening routines is contributing to less variation in cortisol levels during these times of the day.





## Upcoming Family Events

### Annual Twins Day in Twinsburg, Ohio

With the arrival of spring comes the longing for warm summer days and a vacation away from work and school life. Now is the time that many families begin to plan their summer vacations. Those families with twins, however, may be searching for something a little different than the usual trip to Wisconsin Dells. Twinsburg, Ohio has just the solution for you. The Annual Twins Day Festival is held the first weekend of every August. This festival was listed in 1987 by the Guinness Book of World Records as the world's largest annual gathering of twins. Not only twins, but also siblings of multiple births, come from all around the world to celebrate their uniqueness and what they say in Twinsburg, "twinenergy".

Since 1976, Twinsburg, Ohio has held the Annual Twin Day Festival every August. At first, it started off with only 37 sets of twins in attendance, but today over 3000 sets of twins participate in the weekend long activities. Over the years not only has attendance steadily increased but also recognition of the festival. In 1978, a doctor from Tulane was the first person to conduct research at the festival, studying twin hand and footprints. The following year, the festival became international, hosting twins from Lebanon and Poland. In 1980, the governor of Ohio declared the first weekend in August "Twins Day," to be recognized throughout the state. In addition, many people have documented the festival, including the show "That's Incredible." Even the Soviet Union knew about this incredible gathering and invited a couple sets of twins to Moscow's Twin Day. Twins from every state of the union and many countries from around the world travel every August to experience this fantastic weekend.

But don't worry about being too young or too old, the festival has events for everyone. Some include: golf tournaments, children's games, raffles, a wiener roast, parade, chicken dinner, twins contests (ranging from youngest, least alike, most alike and farthest traveled), a talent show, fireworks, group photos, a pancake breakfast, scholarship awards, and a 5K run/walk for melanoma research. Furthermore, non-twin siblings, spouses or anyone else who wants to attend are more than welcome; no one will feel left out at this festival.

This year the festival is held August 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup>. If you want more information about this festival, visit the website at [www.twinsdays.org](http://www.twinsdays.org), call the Twins Day Festival Committee at (330) 425-3652, write to them at Twins Day 9825 Ravenna Road Twinsburg, OH 44087 or email at [twins@twinsdays.org](mailto:twins@twinsdays.org). The website contains maps of Ohio and the surrounding areas of Twinsburg and hotel accommodations. And if you decide that this is the right vacation for you, all of these resources allow you to register. Registration costs \$15 per twin set and includes admission to the grounds, enables you to sign up for events, programs, free entertainment and a free wiener roast. If you are looking for a vacation out of the ordinary but just right for your twins, take a trip to Twinsburg for a once in a lifetime experience.



### Wisconsin Twins Festival

Wisconsin holds its own twin festival in Cassville, Wisconsin. Cassville is one of Wisconsin's oldest towns located in the southwestern corner of the state, right on the banks of the Mississippi. The festival celebrates biological twins and multiple births. This year the festival is scheduled for July 17th. Activities include food, a carnival, games, boat rides, a parade, music, fireworks and much more. For more information, contact Kathleen Polich at (608) 725-5855 or email her at [twinorama53806@yahoo.com](mailto:twinorama53806@yahoo.com). Spend a day with your twins and many others enjoying a beautiful Wisconsin day.

*Happy Mother's Day!*





## Perspective

*The following are thoughts from one of our undergraduate research assistants who is a twin.*

As a child, I never thought of myself as “different” from other kids my age. It is only now as a young adult that I can reflect on my experience growing up and see that my twinship has greatly affected the formation of the person I am today. Today I am a college sophomore, beginning to choose a career path, meet new people and friends, and essentially pursue the part of my life that is to come. Of course, this is the situation of virtually any college student, for college is a time of new beginnings and independence. For my twin and I, however, college also brings independence from each other. In societies like ours, such independence and freedom are highly valued. Yet, when it comes to twins, society does not always emphasize their uniqueness as separate individuals, but instead often emphasizes their uniqueness as a set. Even twins’ own families can fall victim to the tendency of emphasizing twins as a set. In my experience, others’ perceptions of my sister and I as a unit had many implications for our sense of individuality.

Throughout my childhood and adolescence, practically everyone knew me as a twin. When I came to college, however, I was exposed to people who had no knowledge of this. As I began to meet new people and make new friends, they got to know me for my own personal characteristics rather than the characteristics that I shared with my sister. This was a new experience for me, because I was now being viewed as an individual, rather than as a twin. Even now when I tell people that I have a twin sister they have a hard time imagining it. Up until college, the opposite was true—people had a hard time imagining me without my twin.

Despite the tendency for twins to be looked upon as a unit, it is important to note that twinship can be a beautiful thing. Not only do twins share a unique bond of togetherness, but they are also ensured a constant playmate and friend. Twins cannot avoid the challenges that accompany their twinship. The special bond twins share is rare gift indeed. Undoubtedly, I am beginning to realize the value of independence as I, for the first time ever, follow my own path without the constant presence of my twin.

## It Takes Two Fun for All Ages!

“Knock, knock”  
“Who’s there?”  
“Amos.”  
“Amos who?”  
“Amos-quito bit me!”

“Knock, knock.”  
“Who’s there?”  
“Andy.”  
“Andy who?”  
“Andy bit me again!”

### Cornstarch Clay (for items under 3/4" thick)

2 cups (500 ml or .5 liter) cornstarch  
2 cups (500 ml or .5 liter) baking soda  
1 1/4 cups (310 ml) cold water

In a saucepan, combine cornstarch and baking soda. Gradually add water until the mixture is smooth. Heat, stirring constantly, until the mixture reaches a moist mashed-potato consistency. Turn onto a plate, cover with a damp towel. Knead dough when cool enough to handle. Clay is now ready to shape. Add food coloring to make different colors. Roll out the dough into 1cm thick (under 1/2 inch) and have children make handprints. It takes a long time to air dry or dry in a warm oven (200 F) but it may brown a bit. The clay may crack if items too thick or bulky.

### Twins and Autism

We estimate that there are as many as 100 pairs of twins under the age of 16 years in Wisconsin in which one or both twins has autism, or some other form of pervasive developmental disorder (PDD-NOS or Asperger Syndrome). We have great personal and scientific interest in these disorders, and we have just received a small grant from the National Alliance for Autism Research (a parent-founded group) to begin a twin research study to help understand these complex disorders.



Thus far, we have located over 50 twin pairs in which one or both has autism or a related challenge; however, this is an insufficient number to do our research. We would appreciate a phone call or email from the parents of any twin with autism (identical or fraternal, boy or girl, regardless of whether the co-twin has a disorder or not) living anywhere in Wisconsin. We would appreciate our readers mentioning our efforts to parents of twins with autism spectrum disorders. All we need to know at this time are the age and diagnosis of the twins, as well as contact information for the future. We would like to know about the existence of all such twin pairs, even if they might not choose to participate in the study.

Please let us know if your address or phone number changes.

Email: wisconsintwins@waisman.wisc.edu  
Phone: (608) 265-2674



Visit our website!  
<http://psych.wisc.edu/wtp>



As an expert on your own twins, you possess important knowledge. We appreciate the time you take to talk on the phone, fill out questionnaires, and visit with us. Each piece of information furthers research in child development.

We value your input!

### DO YOU HAVE COMMENTS, QUESTIONS, OR SUGGESTIONS?

- If your twins are under the age of 3 years, contact Carrie Arneson at [clarneso@wisc.edu](mailto:clarneso@wisc.edu) or (608) 265-2674.
- If your twins are over the age of 3 years, contact Nicci Schmidt at [nlschmidt2@wisc.edu](mailto:nlschmidt2@wisc.edu) or Cory Schmidt at [ckshmidt@wisc.edu](mailto:ckshmidt@wisc.edu) or (608) 265-2674.
- If you want to relay information to us about a twin or set of twins with autism or other related disorder, please contact Dr. Hill Goldsmith at (608) 262-9932 or [hgoldsm@wisc.edu](mailto:hgoldsm@wisc.edu).

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