

News, views and comments

The 18th International Twin Congress, and a Look at Twin Research in Wales/Twin Research Reviews: Temperamental Similarities and Twin Relations; Maximizing Twin Designs; Rare Tubal Ectopic Pregnancy; Twins' Academic Self-Concept Formation/In the Media: Identical Infant Twins Reunited; Birth of Identical-Fraternal Quadruplets; Identical Twin Comedians; 'Twice in a Lifetime': Meeting an Unrelated Look-Alike; Twins in the Tour de France

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Abstract

The 18th International Society for Twin Studies convention took place between June 15–17, 2023, in Budapest, Hungary. A selective sampling of highlights from the meeting are presented. This is followed by a brief overview of ongoing twin research at the University of Aberystwyth in Wales and some twin treasures in the National Library. Next, reviews of timely research that examine temperamental similarities and twin relations, the maximization of twin research designs, a rare ectopic twin pregnancy, and twins' academic self-concept formation are presented. The final section covers stories appearing in various media sources that are informative, enlightening, and interesting, namely a reunion of identical infant twins, the birth of identical-fraternal quadruplets, identical twin comedians, meeting an unrelated look-alike, and twins in the Tour de France.

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The 18th International Twin Congress, Plus Twin Research in Wales

Twin Congress

The 18th International Twin Congress, organized jointly by the International Society for Twin Studies (ISTS) and the International Foundation for Maternal Periconceptional and Perineonatal Medicine (IFMPPM), took place in Budapest, Hungary between June 15–17, 2023. The organizers were ISTS's co-presidents and monozygotic (MZ) twins, Drs Adam and David Tarnoki, and Professor Gian Carlo di Renzo of Italy. The congress venue was Semmelweiss University. Researchers, physicians, clinicians, and students, representing diverse fields and nearly every continent, were in attendance. As in previous meetings, the International Consortium of Multiple Birth Organizations (ICOMBO), headed by Monica Rankin of Australia, had a significant presence.

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Increased interaction and cooperation among the three groups has been a long-term goal that was evident at this congress.

The meeting began with a series of precongress workshops on special topics reflecting the specific interests of these organizations. Examples included Monitoring During Pregnancy and Labor, Management of a National Multiple Birth Organization (for ICOMBO members) and Updated Findings on Twin-to-Twin Transfusion Syndrome. There were, in addition, precongress workshops on Epigenetics, Imaging Methodology, and Statistical Applications.

Congress began with an opening address that included introductory remarks from Profs Gian Carlo do Renzo, Ruben Quintero, David and Adam Tarnoki, and special guest Prof. Zoltan Papp. Their comments were followed by a lecture by Dr Jenny van Dongen of the Netherlands, titled 'Mysteries of Monozygotic Twins'. It is striking that, despite the growing number of twin studies and twin registries, so much about the origin, nature and variation among MZ twin pairs continues to elude us. Events causing a fertilized egg (zygote) to divide remain uncertain, as do factors predisposing some women to conceive MZ twins. One of the most striking findings reported during the past year is that MZ twinning events appear to leave an indelible methylation signature that can identify individual MZ twins with a high degree of certainty (van Dongen et al., 2021). Later in the congress, in a presentation on epigenetics, van Dongen noted that

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smoking can affect DNA methylation, but is reversible when smoking ceases.

The 2023 congress was exciting because it was held largely in person, whereas several previous meetings were conducted mostly online, due to the COVID-19 epidemic. There were many excellent sessions, but this article provides selected highlights due to the impossibility of my attending every session, most of which were held concurrently. Fortunately, the presentations were recorded and will be made available to organization members.

Veronika Odinstova of the Netherlands reported that there are 60 twin registries worldwide, with over one million twins participating in research. According to Hamdi Mbarek of Tunisia, a twin registry is being developed in Qatar. Once it is functional, it will potentially provide data that will be comparable to data provided by registries outside the Middle East. Yoon-Mi Hur of South Korea has been conducting studies of twins in both South Korea and Nigeria. She noted that the twinning rate is very high in Nigeria, reaching 20–40 twins per thousand births, but is even higher among the Yorùbá. The Yorùbá give each twin in a pair a special name, specifically Taiwo (firstborn twin — 'first to taste the world') and Kehinde (secondborn twin). The Yorùbá celebrate twinship with statues and various rituals (N. L. Segal, 2017).

A highlight that is popular at every Twin Congress is the Bulmer session in which new findings regarding biological events associated with twinning are reported. This session was chaired by Nils Lambalk of the Netherlands and Nick Martin of Australia; a third co-chair, Catherine Derom of Belgium, joined the meeting via Zoom. Veronika Odinstova noted that the frequency of MZ twinning increases with the use of assisted reproductive technology (ART), especially after embryo transfer. Nils Lambalk observed that implanting multiple embryos does not increase the chance of twinning — rather, high quality embryos and a receptive prenatal environment are key. He also noted that cumulated freezing of embryos leads to prematurity and slightly larger infants.

In another session, Sophie Groene of the Netherlands spoke of those twins showing intrauterine growth restriction (IUGR). She noted that the smaller twin tends to have an IQ below that of the larger co-twin and that, despite eventual 'catch-up', the prenatal events underlying restricted growth tend to persist. In contrast, the larger twin appears comparable in development to nontwins. Deborah Davis of the United States offered an update on the well-known Louisville Twin Study (LTS) which she currently directs. The project, which began in 1957, has yielded between 200–300 publications, among them classic papers by researchers Adam Matheny and Ronald Wilson. Data collection ceased in 2000, but information still awaits analysis. Davis noted that the LTS is the only American twin project with longitudinal data spanning infancy to mid-life. Subsequent research efforts will focus on biological versus chronological aging.

Other informative sessions were a book panel chaired by Drs Jeffrey Craig and Nancy Segal. Several timely books and book ideas were discussed. A twin film session, also chaired by Segal, included director/producer Melissa Hogenboom of the BBC in the UK, and Myrthe Buitenhaus, an independent director/producer in the Netherlands. Each discussed the rationale for their film and the process of filming; both films that were shown dealt with twins raised apart, separated for unethical and unknown reasons, respectively. A lively audience discussion followed, and another film session is planned for the next congress.

The closing ceremony was an opportunity to recognize the new administration of ISTS and to present awards. ISTS officers and board members for the coming years include Adam Tarnoki (President), David Tarnoki (Secretary General), and Nick Martin (Treasurer); Jeffrey Craig will be Past President. Monica Rankin stepped down from her Presidency of ICOMBO and will be replaced by Carolyn Lister. Board members are Nancy Segal, Asma Khalil, Petra Zwijnenburg, Jeffrey Craig, Bianka Forgo and Monica Rankin.

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Award winners were Yoon-Mi Hur (James Shields Award — Lifetime Achievement in Twin Research), Hannes Frederik Bode (Galton Award — Early Career Researcher), and Amirreza Alijanpourotaghsara (Gedda Award — Best Student Poster).

Twin Research in Wales

I traveled to the Aberystwyth University in Wales upon conclusion of the Twin Congress. This was an opportunity to present twin research findings to colleagues in the Department of Psychology and the interested public. It was also an opportunity to be updated on an ongoing twin study of humor, headed by Dr Gil Greengross, my host; I am a collaborator on the project and Dr Julie Shermer of the University of Western Ontario in Canada is a co-investigator. The study aims to derive the heritability estimate for humor production ability, something that has never been studied previously.

There was an opportunity to visit the National Library in Aberystwyth, one of six Copyright Libraries in the United Kingdom. It was a fascinating and informative experience; the other five libraries are located in the National Library of Scotland, the British Library, Trinity College Dublin, the Bodleian Library in Oxford and Cambridge University Library. The library in Wales includes among its holdings an immense collection of books and newspapers (6,000,000), maps (1,500,000) and works of art (60,000), detailed on the website of the National Library of Wales (2023). Gil and I were led on a tour by Nia Dafydd, Promotion and Marketing Manager. Prior to our visit, Gil had asked if the library included any twin-related materials and was told it did not. However, librarian Douglas Jones suddenly appeared with a cart bearing several twin sources. They included original copies of Shakespeare's comedic plays, Twelfth Night and Comedy of Errors; The History of Valentine and Orson, the story of twin brothers abandoned in the woods as infants and raised in very different circumstances — printed in 1489 with subsequent versions in later years (Chisholm, 1911); The God of Small Things (1997) by Arundhati Roy, an award-winning novel concerning the childhood of 'two-egg [female] twins', Estha and Rahel (Curtis, 2023); The History of Twins as a Criterion of the Relative Powers of Nature and Nurture by Sir Francis Galton, FRS — this paper was available in an original copy of Fraser's Magazine, XII, in which it was first printed in 1875; Deian a Loli (1927), by Kate Roberts, the story of 7-year-old twins who live with their mother, grandmother, uncle and great-aunt and are separated for 23 years, but eventually reunite (LitCharts, 2014); Twins: And What They Tell Us About Who We Are, by Lawrence Wright (1999); Exploring Twins, by Elizabeth A. Stewart (2000); Twins and Super-Twins (Advancement of Science Series, No, 1), by Horatio Hackett Newman (1942); and several copies of the journal of the Society for Twin Studies, Twin Research (prior to the change of name to Twin Research and Human Genetics in 2005). More recent copies of the journal and several of my books are available only online, largely due to space considerations. Several of these sources are displayed in Figures 1-3.

Twin Research Reviews

Temperamental Similarities and Twin Relations

Researchers from Israel examined associations between MZ and DZ twins' personality similarities and dissimilarities and the nature

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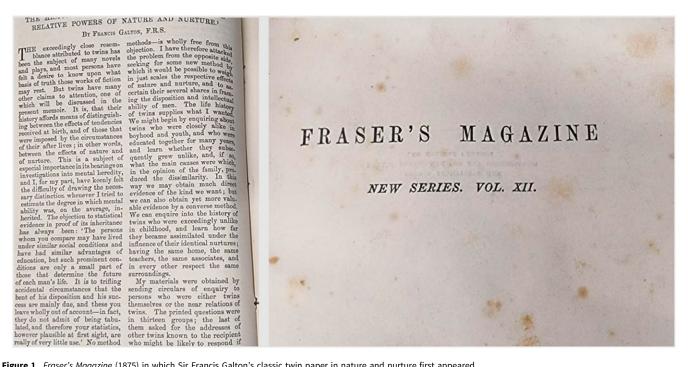


Figure 1. Fraser's Magazine (1875) in which Sir Francis Galton's classic twin paper in nature and nurture first appeared. Source: National Library of Wales. Photograph by Dr Gil Greengross.

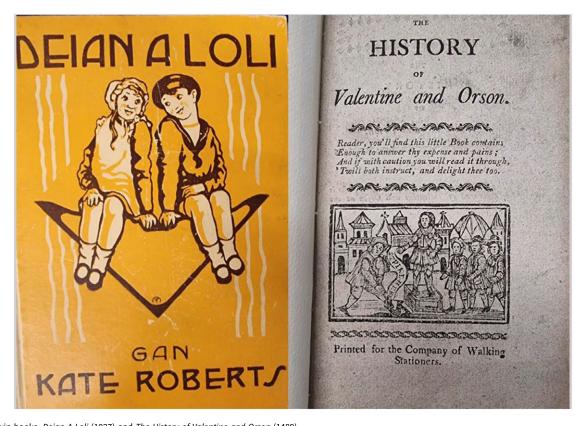


Figure 2. Twin books, *Deian A Loli* (1927) and *The History of Valentine and Orson* (1489). Source: National Library of Wales. Photographs by Dr Gil Greengross.

of their relationships with each other (H. Segal et al., 2023). The participants were 322 MZ twin pairs and 1199 DZ twin pairs between ages 3 and 8 years, as well as 1547 mothers and 536 fathers.

Families were drawn from the Longitudinal Israeli Study of Twins (LIST). Parents separately rated each twin on the five temperamental dimensions (closeness, conflict, rivalry, dependence, and

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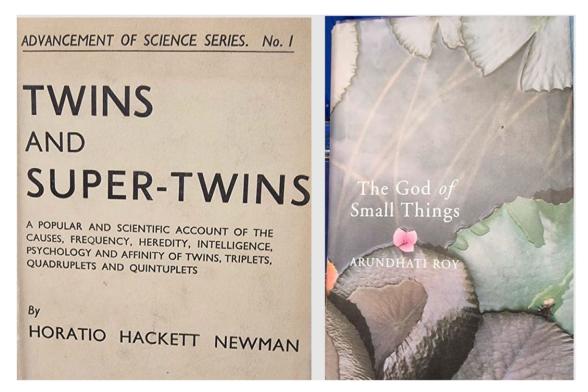


Figure 3. Twins and Super-Twins (1942), by Horatio H. Newman (L) and The God of Small Things (1997), by Arundhati Roy. Source: National Library of Wales. Photographs by Dr Gil Greengross.

dominance) that comprise the Twin Relationship Questionnaire (TRQ). Mothers additionally judged each twin along the temperamental components of the EAS Temperament Survey (emotionality, activity, sociability). Zygosity was established by the twins' concordance/discordance across 10 DNA markers.

Negative associations were found between the twins' closeness and temperamental differences during childhood; this finding was evident beyond the effect of zygosity. In contrast, positive associations were detected between the twins' intrapair conflict and temperamental differences, especially in negative emotionality. The overall conclusion was that personality similarities can influence positive relationships beginning in childhood (and vice versa), and that the effects extend beyond the degree of genetic similarity. The implications of these findings were discussed with reference to school separation and parent-child relations.

Maximization of Twin Research Designs

A cutting-edge review of ways to augment the usefulness of twin research designs was recently published (Hagenbeek et al., 2023). The authors, who variously come from the Netherlands, United States, Finland and Germany, assert that twin studies can inform us not only about heritability, but also about causality, intergenerational transmission, and gene–environment correlation and interaction. Phenotypes, such as obesity, preconceptional measures and post-conceptional variables that would benefit from additional scientific attention are highlighted for future studies. A glossary of terms and a series of diagrams add to the import and impact of this comprehensive review.

Rare Ectopic Twin Pregnancy

Ectopic molar pregnancy has been observed in approximately 1.5 per one million conceptions. An ectopic pregnancy occurs when a

fertilized egg implants and grows outside the main cavity of the uterus (Mayo Clinic, 2023). A molar pregnancy occurs when an egg and sperm join incorrectly at fertilization, creating a noncancerous tumor (Cleveland Clinic, 2023). The apparently first case of an ectopic twin gestation of complete hydatidiform mole and coexisting embryo was recently reported by a research team from China (Shen et al., 2023). A hydatidiform mole is a rare growth or mass that forms inside the uterus early in pregnancy (Medline, 2023).

The patient was a 22-year-old female in her eighth week of gestation who had conceived naturally. She had given birth successfully seven months prior and was breastfeeding at the time her condition was detected, due to experiencing abdominal pain. Surgery (a diagnostic laparoscopy) was performed, indicating a complete hydatidiform molar pregnancy. This type of surgical procedure is recommended in such cases, although firm guidelines for the diagnosis and treatment of rare ectopic pregnancies have not been established. Future investigators are advised to report such cases, albeit rare, to assist medical efforts in their management.

Twins' Academic Self-Concept Formation

Researchers in Germany and South Korea brought an internal/external (I/E) frame of reference model to a study of twins' academic self-concept formation (Kim et al., 2023). According to this model, contrast effects emerged such that high-achieving students had a negative effect on the academic self-concept of other students. However, the question of whether this relationship would be found in twins was of interest. Participants include 4202 individual 11- and 17-year-old MZ and same-sex DZ twin pairs from the TwinLife Study. Academic self-concept was assessed via three items in each domain of German and mathematics. A key

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finding was that of *mirroring* among MZ twins, especially older pairs. Specifically, co-twins' academic achievement and twins' own academic achievement showed parallel patterns of positive effects on academic self-concept within domains, and parallel patterns of negative effects on academic self-concept between domains. This exceptional finding was explained with reference to co-twins' interpersonal similarities.

In the Media

Identical Infant Twins Reunited

Most people think that reunions of separated twins involve only young children and adults. However, a recent meeting of 11-month-old identical twin sisters occurred in early May 2023 (Yu, 2023). The babies were too young to grasp the concept of twinship and the significance of their meeting, but these factors were appreciated by their parents, Dan and Marija Saprano, and the press.

The monoamniotic-diamniotic twins, Nina and Emma, were separated after their delivery by cesarean section at 35 weeks gestation. They were born at New York City's Morgan Stanley Children's Hospital. They were separated because Nina was born with Pierre Robin syndrome, a rare condition that includes a small jaw, cleft palate and tongue set far back in the mouth. The condition seems to have come from being trapped in her sac, a situation that interfered with normal growth and development. After a series of surgeries and other treatments at the Blythedale Children's Hospital in Valhalla, NY, the twins were finally reunited. Despite their identical DNA, the girls look somewhat different since the condition and its aftermath altered Nina's facial contours to some degree. Nevertheless, a video of their meeting included with the article is poignant and heart-warming, especially when Emma reached out to touch her twin sister.

Birth of Identical-Fraternal Quadruplets

An unusual set of quadruplets was born on March 14, 2023 (Gates, 2023). Michael and Hannah Carmack of Birmingham, Alabama welcomed Evelyn and Adeline, and David and Daniel into their family. The couple, who had a young daughter and wished to have a second child, were understandably shocked by the news of a higher order multiple birth. Their naturally conceived twins, born by cesarean section at 27 weeks' gestation, remained in the hospital until June.

What makes this quadruplet set unusual is that the two girls and two boys are each identical twin pairs. That means they can also be organized into four sets of opposite-sex fraternal pairs. In 2005, I described a similarly conceived quadruplet set in Canada comprised of all males (N. L. Segal, 2005); however, the Carmack children may be the first set to include one identical male pair and one identical female pair. I forwarded this information to staff at *Guinness World Records* and plan to research this event on my own, as well. News of such sets from readers of *TRHG* would be welcome.

Identical Twin Comedians

Identical female twins, Annabel and Sabina Meschke, are gaining attention with their comedic performances in New York City and elsewhere (Lee, 2023). Most recently, their short film, *Pennies*, directed by Sandy Honig, earned a special jury award at the annual South by Southwest film festival in Austin, Texas. The twins, who were born in Atlanta, Georgia in 1997. Their career actually began

when they were 8 years old and were enrolled in an improvisation class. According to their mother, they loved the class and were very good at mastering the material. They later became students at New York University where they studied media, production, and dramatic writing. They also took part in the comedy scene of the city.

Today the twins enjoy a close relationship but acknowledge their behavioral differences both on stage and off. Annabel is more dominant and outgoing, while Sabina is more emotional and reserved. The twins attend couples therapy, although the reasons are unclear. They live apart but see each other on a regular basis — their longest period of separation has been just two weeks. Given that comedy has typically been the purview of males — I described a pair of identical twin male comedians in a previous issue of *TRHG* (N. L. Segal, 2019) — it is refreshing to see females, especially identical twins, attract attention in this area of entertainment.

'Twice in a Lifetime': Meeting an Unrelated Look-Alike

Unrelated look-alikes or doppelgängers have fascinated writers, artists, photographers and the public for decades (Reed, 2023). In the last few years websites have been developed allowing people to find a potential look-alike, both human and nonhuman — it is possible to look for images of oneself in paintings and sculptures displayed in museums across the globe. More recently, unrelated look-alikes have been of interest to psychologists who have assessed their behavioral similarities (N. L. Segal et al., 2018) and geneticists who have examined their genetic commonality (Joshi et al, 2022).

Reed (2023) described her own experience searching for her look-alike. There was ambivalence as she delayed looking at the other person's face — perhaps there would be envy or rivalry. She also claims to understand the temptation to 'slip into' the life of another person without anyone noticing. Reed recounted an incident she had heard of a woman who tried to steal the identity of her look-alike by giving her poisoned cheesecake. She lost consciousness and when she returned home from the hospital, she discovered that her passport and papers were missing. The culprit was sent to prison for 21 years. Other dark stories are also told in this article. My own research showed that most look-alikes did not form close relationships after meeting — but there have been no criminal attempts of which I am aware, and while a few pair members have grown close, they are the exceptions. It is wrong to assume that physical matches imply behavioral matches, given that they are influenced by different genetic and environmental factors.

It is curious that many identical twins do not believe they look alike despite their ability to confuse other people. Their family members also have no difficulty distinguishing between them. Perhaps that is because the constant presence of these individuals sensitizes onlookers to subtle differences between the twins that become magnified in their mind. In contrast, most doppelgängers see the physical similarities, probably because they are meeting for the first time.

Twins in the Tour de France

Identical twins, Adam and Simon Yates of Great Britain, finished the first stage of the Tour de France in first and second place, respectively (Associated Press, 2023). This year the race began in the Basque region of Spain, situated in the northern part of the country. The twins, who are 30 years of age, represent different teams — Adam cycles for UAE Team Emirates, while Simon cycles for Team Jayco–AlUla

At the conclusion of the beginning stage, Adam (who placed first) reflected that the twins 'worked together. I speak to him every day, we are close. To share this experience with him was really nice. I'm speechless, super happy.' This view is typical of many athletic identical twins who compete at both amateur and elite levels (N. L. Segal, 2000).

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