

## News, Views and Comments

# Twin Types: Variations and Common Themes/Twin Research Reviews: Birth Weight and Brain Development; Twinning and Vocabulary Knowledge; Fetal Loss in Twin Pregnancy; Twin-Family Olympic Medal Winners/Human Interest: Young Twin Soldiers; Twin-Run Laundry; Male-Female Pair and Politics; Twin-Based Graphic Novel; Twin Sisters' Deliveries

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### Abstract

Modern reproductive technology and revisions of conventional family structures have yielded a curious array of twin-like sibships. Many of these pairings pose the same rearing questions and educational issues for parents and teachers as do ordinary monozygotic and dizygotic twins. This article considers how we classify these sibships, given the important implications for the pair members, their families, their friends and the professionals who care for them. Next, reviews of research on twins' birth weight and brain development, twinning and vocabulary knowledge, fetal loss in twin pregnancy and twin-family Olympic medal winners are presented. The final topic covers recent media attention to young twin soldiers, a twin-run laundry, a male-female pair's political differences, a twin-based graphic novel and twin sisters' deliveries.

### Twin Types: Variations and Common Themes

On September 24, 2020 I delivered a keynote address to an online conference, organized by Multiple Births, Canada — Temiskaming Multiple Births. Mother of twins, Ginger Bowles from the Calgary Chapter, was interested in my discussion of virtual twins, that is, twin-like siblings who are genetically unrelated, but are close in age and enter the family at nearly the same time. Her club had been discussing the novel variants of twin types generated largely by the new reproductive technologies. I was quite interested in seeing her categorization and believed it would be of interest to the readers of *Twin Research and Human Genetics* who surely come across unusual twin-like pairings from time to time.

This was not my first attempt at such classification — my first effort at deciding who was and who was not a twin was motivated by the controversy surrounding the July 5, 1996 birth of Dolly the cloned lamb. I noted that scientists, journalists and the general public often — and incorrectly — used the terms *twins* and *clones* interchangeably. Twins are clones by definition (genetically identical organisms), but I argued that clones are *not* twins because of differences in events related to conception, gestation and cohort (Segal, 1997, 2002, 2006).

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I have reprinted Ginger Bowles's twinship categories exactly as stated and the definitions she provided. I will provide my comments after each one.

### Traditional Multiples

More than one baby born in one womb, to one parent, during the same gestational period.

*Segal:* I agree with this definition of traditional multiples.

### Surrogate Multiples

When siblings are born within 90 days\* of each other using one or more surrogates. (\*Explanation for the 90-day interval: The 90-day interval, indicated by Ginger Bowles, did not arise by chance. The longest birth interval between twins is 87 days (nearly 3 months), an event that admitted Irish-born twins, Amy and Katie Jones-Elliott, into the *Guinness World Records* (Bennett-Smith, 2013; *Guinness World Records*, 2020). Ms Bowles explained that her club members rounded up the 87-day interval to 90 days.

*Segal:* I do not believe that 'surrogate multiples' qualify as twins because they were carried by two or more women with different physiological profiles, genetic backgrounds and health histories. Of course, if the embryos were created by the same man and woman, the children would share the same genetic relationship as dizygotic (DZ) twins and full siblings. If the embryos were the products of ova released by one woman and fertilized by different men, they would 'replay' superfecundated twins, which occur naturally as long as the womb was shared. Another possibility that

was not considered was embryos created by the same man and a different woman (either used immediately or frozen for later use. If one was gestated in a different pregnancy than the other, even if carried by the same woman, the two offspring would not qualify as twins). Another circumstance in which this occurs is sperm donation, in which some women become pregnant via their own egg(s) and a common male donor. This procedure can produce scores of children who are genetic half-siblings. However, this form of conception does not occur naturally — there is no reverse parallel to superfecundation. (See the section below on same-sex couples for further discussion of this issue.) I believe the children conceived by sperm donation can be considered half-siblings, even if they have never met, reasoning that some divorced individuals often have children with their former and current spouses years apart. Consistent with this reasoning is that twins reared apart from birth enter into their twinship when they are reunited years later (Segal, 2012).

One might ask: If one man impregnated identical twin women who delivered their babies on the same day, would the children be twins? I would say no because even identical twins are not strictly biologically equivalent, such that the prenatal environments they provide to the fetuses might differ. In the last section of this article on twins in the media, I describe a case in which monozygotic (MZ) twins delivered their daughters on the same day, conceived by different men. This situation captures some elements of superfecundation — ‘same mother’ genetically speaking and different fathers — but the intra-uterine environments are not strictly the same and superfecundation has only a 12- to 48-hour window for fertilization to occur (although sperm are viable for 7–10 days), given the simultaneous release of two eggs (Asseta, 2015; Segal et al., 2020).

Using the 90-day criteria, it might be claimed that related children born within a 90-day interval to different mothers are twins, but I would disagree, as I explain below. The next question is: What is the relationship between children conceived when MZ twins marry MZ twins? The children created by each identical couple would be genetically equivalent to full siblings, as well as double first cousins. I encountered a novel case in which the babies of two identical couples were born on the same day. These children would be the genetic equivalent of DZ twins, but should not be considered as such because their mothers may have experienced different pregnancy events. The psychological effects on the children could be harmful if they felt forced into what they felt was an unnatural relationship.

### Adoption Multiples

When a parent/surrogate who bears a child and the applicant also adopts another child or children who are born within 90 days of each other; or, when an applicant adopts two or more children from two or more sources who were born within 90 days of each other.

*Segal:* I have studied 169 such pairs that I call ‘virtual twins’ or VTs. These children mimic twinship by virtue of their close age and entry into the family. However, I would not refer to them as multiples, which implies a multiple birth. Just as DZ twins differ more, on average, from MZ twins, largely due to their lower coefficient of relatedness, it would be wrong to regard ‘adoption multiples’ (or VTs) as twins, given their total lack of genetic relatedness. I believe that differing in age by no more than 9 months and arriving in the home by 1 year of age are justifiable criteria for virtual twinship. That is because some newborn twins are kept in the hospital for months at a time due to medical problems, while a healthier co-twin goes home.

*Another note:* I have set the age difference between virtual twins at 9 months because this is the largest age difference between classmates; being enrolled in the same school grade is required for classification as a virtual twin. The topic of virtual twins is revisited in the section that follows.

### Same-Sex Family Multiples

When a same-sex couple gives birth, individually to a child/children that are born within 90 days of each other.

*Segal:* There are cases in which same-sex male couples have conceived twins via a surrogate. I agree that the children conceived in this way are twins because they reenact a natural twinning process I mentioned above, that is, superfecundation. In other words, the ova come from the same woman, and the babies’ gestation takes place in the same womb at the same time, yet they have different fathers. The children would share the intrauterine environment and be born at the same time.

### Combined Multiples

Circumstances that meet two or more of the above requirements.

*Segal:* It is difficult to address the question of ‘combined multiples’ without knowing the specific events. I have studied some unusual virtual twins, but I do not believe that any of them can be usefully considered in more specific categories unless available in large numbers. I have worked with several mothers who conceived triplets via assisted reproduction, and also adopted a near-in-age child; see Figure 1. I would not consider the three pairings of each triplet with the adoptee to be more than virtual twins. I also studied a pair in which one child was gestated by the mother’s pregnancy via embryo donation and the other child entered the family by adoption. A third situation involved the pregnancy of a surrogate from sperm donated by the father and the adoption of a second near-in-age child. There may be other unusual cases of virtual twins I have not considered or encountered.

Two exceptional cases are worth mentioning. A woman from the Netherlands delivered twins, conceived by in vitro fertilization (IVF), from embryos created by her and her husband. However, following an error in the laboratory, one of her eggs had been fertilized by sperm that came from another donor. This scenario mimics superfecundation in which both children are related to the same mother, but not to the same father. The boys were raised as twins, as I believe they are — the biological father of one of the twins (not the woman’s husband) did not care to pursue a relationship with the family (Curry, 2005). A second case is less clear cut, but calls into question the interesting issue of whether shared gestation in the absence of biological relatedness qualifies the babies to be twins (Gottlieb, 1999). A Caucasian woman was inadvertently implanted with one of her own embryos and an embryo created by a Black couple. She delivered healthy twins. A lawsuit was filed against the doctor who was not allowed to practice IVF. The Caucasian couple was willing to relinquish custody of the nonbiological twin pending DNA test results showing that the child belonged to the Black couple. Had the Caucasian couple eventually raised both infants (one their own and one that was unrelated), I would consider them to be twins. That is because they display the essential elements of twinship: nearly simultaneous embryo creation, shared intra-uterine environment and time of delivery. Of course, the two siblings would be completely genetically unrelated — it is theoretically possible, but practically impossible, for two children born to the same parents to share no common genes.



**Fig. 1.** Triplets and a near-in-age adoptee generate three virtual twin pairs. Courtesy of the family; also reproduced from Segal (2000).

### Other Classifications

The multiple birth mothers of Calgary also wanted to know:

1. Would we include another classification called virtual twins, which would include Surrogate as long as they are not the same egg and/or sperm?

*Segal:* I do not think that is needed. The basic definition of virtual twins covers many types as I indicated above. Additional refinement does not seem needed, barring special circumstances.

2. Would adoption be considered virtual twins under all circumstances?

*Segal:* Approximately 75% of the virtual twin pairs in my study came together because of adoption. The remaining 25% are mostly biological-adopted pairs. As long as the children meet the requirements for age spacing and date of arrival, they can be considered virtual twins.

3. Would same-sex family multiples be included in virtual twins unless they used the same donors, either for egg or sperm or both?

*Segal:* Yes — there is a same-sex female couple in my virtual twins study in which both mothers entered into their relationship with an infant biological daughter with a same-age infant conceived with a different father.

### Comment

Some parents of twins welcome parents of twin-like children into their clubs, given that many of the developmental issues they confront are similar; for example, enrolling children in the same or separate classrooms, balancing individuality and sibship, and dividing parental attention fairly. Other parents of twins feel that their clubs should be reserved for traditional twins only. I believe that all mothers and fathers raising twins and near-in-age children can benefit from sharing their experiences and insights. It is likely that the mothers of virtual twins and other near-in-age children will eventually gravitate toward one another in a club setting, given

that their situations do differ, and may differ more over time. It is also likely that this process would work this way with mothers of twins, in that mothers of MZ twins have more in common with other mothers of MZ twins than they do with mothers of DZ twins. Therefore, I would favor opening membership of mothers of twins clubs to mothers of nontraditional sibling pairs.

### Twin Research Reviews

#### Birth Weight and Brain Development

Researchers from Canada, France and Ireland collaborated on a study investigating the effects of birth weight differences on adolescent brain development (Hayward et al., 2020). The participants were 53 MZ twin pairs of which 42% were male. The twins were recruited from the Québec Newborn Twin Study in Québec, Canada. Zygosity was determined by analysis of cotwins' matches and nonmatches across eight or nine polymorphic genetic markers. All twins underwent magnetic brain imaging with a focus on structural connectivity strength and limbic network connectivity. Compared to their higher birth weight co-twin, lower birth weight twins showed reduced efficiency in limbic network connectivity. Lower birth weight male twins also had relatively fewer tracks connecting the right hippocampus (a part of the brain involved in learning and memory) and right amygdala (a part of the brain concerned with emotional expression). The authors concluded that their findings highlighted a unique source of within-pair variation in MZ twin pairs. They correctly noted that it will be of interest to determine whether these differences translate into behavioral differences in the future.

#### Twining and Vocabulary Knowledge

A recent twin study of language acquisition was reported by (Wong et al., 2020). Twins are known to lag behind non-twins in language development, mostly attributed to (1) twins' constant companionship with one another that appears to limit their verbal interaction with others, and (2) reduced verbal experiences with their mothers who, by necessity, are more controlling of social situations involving both twins. Several recent case reports have found that

twin–twin–parent interactions may benefit twins' ability to converse, but these observations require replication (see Segal, 2017).

The researchers recruited twins and non-twins from lower-middle and middle-class neighborhoods in Hong Kong. The final sample included 150 twin individuals and 150 non-twins; approximately half of each sample was female. The two groups were matched for age, gender, grade level, nonverbal intelligence, parents' education, family income, number of children and number of residents in the home. Twins' and singletons' nonverbal ability was assessed with the Raven Progressive Matrices. Children's receptive vocabulary, expressive vocabulary and word definition were examined with a measure developed by a Chinese psychologist, adapted for purposes of the study. The specific aim was to compare the proficiency of the two groups in their native Cantonese language and in English.

The singletons outperformed the twins on the language tests involving Chinese. In contrast, group differences were not observed on tests involving English, especially when controlling for exposure to English at home. Using exposure to English at home as a covariate reduced the group effect on English receptive vocabulary to nonsignificance, reduced the group effect on English expressive vocabulary to marginal significance and left the English word definition nonsignificant as it was prior to the covariance analysis. Controlling for exposure to English at home did not affect the Chinese language measures. The authors concluded that the twins' deficit in Cantonese reflected their increased competition for parental attention, relative to non-twin children. Unfortunately, the age spacing of the non-twins was not provided — if two siblings are close in age they might well compete for parental time. More importantly, the zygosity of the twins was never mentioned. If the twin sample had included a high percentage of identical twins (likely in an Asian sample), who are especially susceptible to early birth hazards, and/or who engaged in private speech, this may have affected the findings (see Segal, 2017).

### *Fetal Loss in Twin Pregnancy*

A review and meta-analysis of fetal loss in twin pregnancies following amniocentesis or chorionic villus sampling (CVS) for identifying fetal anomalies was reported by researchers from the UK, Russia and Italy (Di Mascio et al., 2020). Pregnancy outcomes were then compared with those whose mothers did not undergo these procedures. The main finding was that risk of fetal loss was lower than had been reported previously. Previously reported rates were between 2.5% and 3.2% for amniocentesis and 3% following CVS. The current meta-analysis shown a 2% risk of fetal loss after amniocentesis, consistent with findings from the American College of Obstetricians and Gynecologists in terms of testing for genetic anomalies. The findings for CVS were 2% for women undergoing the procedure, compared with 1.8% for those who did not. Overall, there appeared to be no significant difference when the procedures were performed before 24 weeks gestation and followed up over the next 4 weeks.

### *Twins and Olympic Medals*

The probabilities of winning an Olympic gold medal were compared between athletes with no history of relatives who had participated in the Olympic games, with those of athletes whose relatives (grandparent, aunt, uncle or siblings) were either participants or medal winners (Antero et al., 2018). Probandwise concordance rates based on data from MZ and DZ twins were used to assess heritability; the data covered all 125,051 athletes who had

participated in the Olympics between 1896 and 2012. The project was designed as a twin-family retrospective study. The zygosity of the 21 MZ twin medalists and 53 DZ twin medalists was determined by 'height, public report or self-report in relation to their zygosity, and description regarding concordance in their appearance, and finally their picture'. Twins differing in gender and/or height were publicly reported to be a fraternal twin; or if they had a data profile or picture displaying phenotypic differences were considered to be fraternal twins.

A total of 5661 athletes were related to other Olympians, of whom 1404 had more than one relative who had participated; in such cases, the kinship with the highest degree of genetic relatedness was used. Olympian medalists who were unrelated to other Olympians numbered 119,390, and of these 24,319 were medalists. The expected historical probability of winning a medal was 20.4%.

The percentage of medal winners aligned almost perfectly with degree of genetic relatedness: 20.4% (expected probability of being a medal winner), 36.8% (grandchild), 44.4% (niece or nephew), 43.4% (child), 64.8% (sibling), 75.5% (DZ twin) and 85.7% (MZ twin). The only exception was the very slight decline for child, compared with niece and nephew. There were 21 MZ twin medalists in 9 concordant pairs and 3 discordant pairs; there were 53 DZ twin medalists in 20 concordant pairs and 13 discordant pairs. MZ twins showed significantly greater concordance (85.7%) than DZ twins (75.5%), with heritability estimated at 20.5%.

Elite sports performance is a function of many physical and behavioral traits, a point made by this paper. In my own experience, identical twin athletes claim that during their growing-up years they have the advantage of having a constant practice partner. Their matched body traits (e.g. height, weight and muscle strength) and psychological attributes (e.g. interests, motivation and self-esteem) are some of the ingredients contributing to identical twins' more similar sports performance, relative to that of fraternal twins. That genetic factors are at work also explains, in part, why Olympic medalists share their talents with family members.

### **Human Interest**

#### *Young Twin Soldiers*

Thirty-two-year-old identical twins, Johnny and Luther Htoo, were boy soldiers in Myanmar (Beech, 2020). That was in 1999, when other soldiers believed that the twins possessed magical powers — it was thought that Johnny could walk on water. The people promoted the view that the twins would protect the rebel army from bullets during battle. The rebel army was composed of the Karen people who have been fighting against the people in what is now Burma, after Burma gained independence from Great Britain in January 1948. The twins joined the Karen National Liberation Army in 1998 as had their father years before.

The twins never fulfilled the aims of the army they were leading. The soldiers they led lost faith in them and began calling them derogatory names. The twins went into exile in Thailand along with many of those they had commanded, and eventually moved to Sweden where they were told that the fish was good. Johnny stayed there for 10 years. He married and had five children, but he is currently divorced. With the help of a pastor, Johnny and his five children relocated to Bern, New Jersey, a city with other Karen refugees. One of them, a woman, knew about the twins having heard their story from her uncle. They commandeered the resistance movement as small children, but their efforts never led to victory. They twins are now confronting addiction, as well as the loss of their family and country.

### Twin-Run Laundry

The November 23, 2020 issue of *The New Yorker* magazine includes an advertisement for Celsious, an upscale laundromat in New York City's Williamsburg neighborhood of Brooklyn. Featured on the ad were the laundromat's owners, Corinna and Theresa Williams, who appear to be identical twins; research confirmed their twinship (Abramson, 2019). The Williams twins, who were born in Germany, created Celsious to enhance the chore of doing laundry (Cogley, 2018). Their two-floor establishment has modern washers and dryers installed on the ground floor, a café on the second floor, and attractive furniture and plants placed throughout the establishment. Given the COVID-19 pandemic, the twins chose to allow laundry drop-offs only, online booking and dedicated times to accommodate first responders and immunocompromised individuals. The name 'Celsious' derives from their European background that uses the metric system; they explained that Celsius was purposely misspelled due to dot-com rights.

### Male-Female Pair and Politics

I was intrigued, but not surprised, by an article describing the political views of the author, Jeneen Interlandi, and her complete opposition to those of her twin brother (Interlandi, 2020). The twins were born in Medellin, Colombia and adopted by a Sicilian-American couple living in New Jersey (Bennet et al., 2018). The twins had a warm relationship with one another, but that changed somewhat with the 2020 election. Interlandi supported former United States Vice-President Joe Biden for President, while her twin brother favored a second term for President Donald Trump. Interlandi not only opposes her brother in this regard, she finds his views 'unfathomable'. They cannot discuss this topic amicably. This divide is the first one that has come between them.

Interlandi is trying to understand the roots of their political difference. She does not hold her adopted parents responsible — both her parents were lifelong Democrats who had worked diligently for a living. They believed that the financial hardships they eventually faced reflected their failure to work hard enough. Interlandi and her brother invest a great deal in their jobs, but their views of the Democratic party differ dramatically. Interlandi sees the Democratic party as favoring the middle class, while her brother claims that the Democratic party is out of touch. The twins learn their news from different sources, practices that reinforce their opposing views. However, neither their parents nor what they hear and read can fully explain the twins' differences.

Interlandi failed to reference twin research studies showing genetic effects on attitudes and interests which burgeoned since the mid-1980s (Martin et al., 1986; Waller et al., 1990). This body of work may have provided her with insights into the striking differences between herself and her twin brother. One study found that affiliation with a particular party does not show genetic effects, although how intensely one participates in political activities shows an equal balance of genetic and nonshared environmental influences (Hatemi et al., 2009). There is a genetic correlation between personality traits and political attitudes, but personality was not found to be a causal factor in political leanings (Verhulst et al., 2012). A study that combined twins, parents and non-twin siblings found a greater influence of genetic factors on social and political attitudes than studies relying on twins alone (Hatemi et al., 2010). More recently, Bell and Kandler (2015) presented a model showing that political party identification has a

partial genetic basis, political orientation and party identification share genetic variance, and political orientation may mediate genetic influence on party identification. Interlandi, having been unable to identify family factors linked to the twins' contrasting views, is left with genetic effects and nonshared experiences to explain the twins' different political outlook. It would be of interest to obtain information on their biological parents' personality traits, attitudes, interests and political activities to see how they align with those of their adopted away children. Interestingly, Jeneen Interlandi never mentions her twin brother by name.

### Twin-Based Graphic Novel

A graphic novel is one whose content is based on comics and follows a particular story line throughout (New World Encyclopedia, 2017). The material is typically fictitious and in novel form, but the term is now used more widely to include nonfiction, short stories and work from anthologies. *Twins: A Graphic Novel* is the first of its kind to feature a pair of black twins. Inspired by his own twin children, *Twins* was written by Varian Johnson and illustrated by Shannon Wright (2020).

The fictional twins in *Twins* appear to be identical based on their generally similar appearance. The story in brief is that twins, Francine and Maureen Carter, are the best of friends who participated together in all school activities. However, as they were about to enter the 6th grade there was a marked rupture in their relationship (Johnson, 2020). At the time of printing, I had not read *Twins*, but intend to.

### Twin Sisters' Deliveries

Thirty-three-year-old identical twins, Autumn Tramontana and Amber Shaw, delivered their daughters just 90 minutes apart (Pelletiere, 2020). Their delivery date, October 29, turned out to be their own date of birth. The twins, who live in Knoxville, Tennessee, delivered their babies at the Sanders Regional Medical Center. Both women were induced. Amber's daughter weighed nine pounds, four ounces, and Autumn's daughter weighed seven pounds, two ounces. Prior to becoming mothers, the twins had attended nursing school together, then married and became pregnant with their older sons at the same time. However, they had not planned on becoming pregnant again at the same time — Amber, who had experienced infertility issues after her son was born, learned she was pregnant again a few months after having a miscarriage on Christmas Day, 2019.

The twins' daughters are mentioned in this article as an unusual variant of natural twinning, that is, superfecundation. That is because the two sets of children have genetically identical mothers, have genetically unrelated fathers and were delivered on the same day, but were most likely conceived on different days. Thus, they replay essential features of superfecundated twins. However, in the main part of this article I stated my reasons for why I believe these two female infants are not truly twins.

### References

- Abramson, A. (2019, July 10). The perfect laundromat doesn't ex wait. It's beautiful, comfortable, AND has free detergent? *Consumer Reports*. <https://www.apartmenttherapy.com/celsious-laundromat-brooklyn-36623836>
- Antero, J., Saulière, G., Marck, A., & Toussaint, J. F. (2018). A medal in the Olympics runs in the family: A cohort study of performance heritability in the Games history. *Frontiers in Physiology*, 9, 1313.

- Asseta, H.** (2015, May 8). New Jersey judge rules twin girls have different fathers. *CNN*. <http://www.cnn.com/2015/05/08/us/new-jersey-twins-two-fathers/index.html>
- Beech, H.** (2020, October 12). 'We were bullet-proof': As child soldiers grow up, legacy of war lingers. *New York Times*. <https://www.nytimes.com/2020/10/12/world/asia/myanmar-thailand-gods-army-htoo-twins.html>
- Bell, E., & Kandler, C.** (2015). The origins of party identification and its relationship to political orientations. *Personality and Individual Differences*, 83, 136–141.
- Bennet, J., Kinsbury, K., Dao, J., & Silverstein, J.** (2018, April 11). Jeneen Interlandi to join New York Times Editorial Board and Magazine. *New York Times*. <https://www.nytimes.com/press/jeneen-interlandi-to-join-new-york-times-editorial-board-and-magazine/>
- Bennett-Smith, M.** (2013, April 30). Twins born 87 days apart could break Guinness World Record for interval between births. *Huffington Post*. [https://www.huffpost.com/entry/twins-born-87-days-apart-ireland-guinness-record\\_n\\_3186135](https://www.huffpost.com/entry/twins-born-87-days-apart-ireland-guinness-record_n_3186135)
- Cogley, B.** (2018, June 30). Corinna and Theresa Williams pair laundromat and café at Celsius in Brooklyn. *De Zeen*. <https://www.dezeen.com/2018/06/30/corinna-theresa-williams-celsius-laundromat-cafe-williamsburg-brooklyn/>
- Curry, A.** (2005, September 23). The world's least alike twins. *NBC News*. <https://www.nbcnews.com/id/wbna9438648>
- Di Mascio, D., Khalil, A., Rizzo, G., Buca, D., Liberati, M., Martellucci, C. A., ... D'Antonio, F.** (2020). Risk of fetal loss following amniocentesis or chorionic villus sampling in twin pregnancy: Systematic review and meta-analysis. *Ultrasound in Obstetrics & Gynecology*, 56, 647–655.
- Gottlieb, S.** (1999). US couple files malpractice lawsuit against doctor for embryo mix up. *British Medical Journal*, 318, 1025.
- Guinness World Records.** (2020). Longest interval between birth of twins. <https://www.guinnessworldrecords.com/world-records/67465-longest-interval-between-birth-of-twins>
- Hatemi, P. K., Alford, J. R., Hibbing, J. R., Martin, N. G., & Eaves, L. J.** (2009). Is there a 'party' in your genes? *Political Research Quarterly*, 62, 584–600.
- Hatemi, P. K., Hibbing, J. R., Medland, S. E., Keller, M. C., Alford, J. R., Smith, K. B., ... Eaves, L. J.** (2010). Not by twins alone: Using the extended family design to investigate genetic influence on political beliefs. *American Journal of Political Science*, 54, 798–814.
- Hayward, D. A., Pomares, F., Casey, K. F., Ismaylova, E., Levesque, M., Greenlaw, K., ... Booij, L.** (2020). Birth weight is associated with adolescent brain development: A multimodal imaging study in monozygotic twins. *Human Brain Mapping*, 41, 5228–5239.
- Interlandi, J.** (2020, November 4). I love my twin. How did we end up so far apart. *New York Times*. <https://www.nytimes.com/2020/11/04/opinion/2020-election-trump-family.html>
- Johnson, V.** (2020). *Twins: A graphic novel*. Graphix.
- Martin, N. G., Eaves, L. J., Heath, A. C., Jardine, R., Feingold, L. M., & Eysenck, H. J.** (1986). Transmission of social attitudes. *Proceedings of the National Academy of Sciences*, 83, 4364–4368.
- New World Encyclopedia.** (2017). Graphic novel. [https://www.newworldencyclopedia.org/entry/Graphic\\_novel](https://www.newworldencyclopedia.org/entry/Graphic_novel)
- Pelletiere, N.** (2020, November 6). Twin sisters give birth 90 minutes apart, on their birthday. *Good Morning America*. [https://abcnews.go.com/GMA/Family/twin-sisters-give-birth-90-minutes-birthday/story?id=74058165&cid=social\\_twitter\\_abcn](https://abcnews.go.com/GMA/Family/twin-sisters-give-birth-90-minutes-birthday/story?id=74058165&cid=social_twitter_abcn)
- Segal, N. L.** (1997). Behavioral aspects of intergenerational cloning: What twins tell us. *Jurimetrics*, 38, 57–67.
- Segal, N. L.** (2000). *Entwined lives: Twins and what they tell us about human behavior*. New York: Plume.
- Segal, N. L.** (2002). Human cloning: A twin-research perspective. *Hastings Law Journal*, 53, 1073–1084.
- Segal, N. L.** (2006). Psychological features of human reproductive cloning: A twin-based perspective. *Psychiatric Times*, 23(14).
- Segal, N. L.** (2012). *Born together-reared apart: The landmark Minnesota twin study*. Harvard University Press.
- Segal, N. L.** (2017). *Twin mythconceptions: False beliefs, fables, and facts about twins*. Elsevier.
- Segal, N. L., Craig, J. M., & Umstad, M. P.** (2020). Challenge to the assumed rarity of heteropaternal superfecundation: Findings from a case report. *Australian Journal of Forensic Sciences*, 52, 547–552.
- Verhulst, B., Eaves, L. J., & Hatemi, P. K.** (2012). Correlation not causation: The relationship between personality traits and political ideologies. *American Journal of Political Science*, 56, 34–51.
- Waller, N. G., Kojetin, B. A., Bouchard Jr, T. J., Lykken, D. T., & Tellegen, A.** (1990). Genetic and environmental influences on religious interests, attitudes, and values: A study of twins reared apart and together. *Psychological Science*, 1, 138–142.
- Wong, S. W. L., Cheung, H., Zheng, M., Yang, X., McBride, C., Ho, C. S.-H., ... Wayne, M. M. Y.** (2020). Effect of twinning on Chinese and English vocabulary knowledge. *Child Development*, 91, 1886–1897.