

NEWS, VIEWS AND COMMENTS

Twins Working Together: Collaboration or Contest/Twin Research: Molar Pregnancy; Social Support; Conjoined Twins; Immune Discordance/Headlines: Twin Politicians; Multiple Birth Marriages; Guinness World Record; Museum of Memory and Human Rights (Santiago, Chile)

Nancy L. Segal

Department of Psychology, California State University, Fullerton, California, USA

Twin research has found genetic influence underlying vocational interests, work values, and job satisfaction. In addition, numerous studies have shown that monozygotic (MZ) twins generally display greater within-pair cooperation and social closeness than dizygotic (DZ) twins. These findings are illuminated by exploring the occupational histories of two female twin pairs, one set MZ and the other set DZ. This is followed by a review of timely twin-based research reports on molar pregnancy, social support, conjoined twinning, and immune discordance. Finally, news items regarding identical twin politicians, multiple birth marriages, a new Guinness World Record for twins, and a twin-family story from the Museum of Memory and Human Rights in Santiago, Chile are both interesting and informative.

Twins Working Together: Collaboration or Contest

Twin research has shown that individual differences in vocational interests, work values, and job satisfaction are influenced, in part, by genetic factors. Based on findings from the Minnesota Study of Twins Reared Apart (MISTRA), genetic effects on vocational interest scales, as assessed by the Strong-Campbell Interest Inventory, ranged from 0.20 to 0.51. The Jackson Vocational Interest Survey showed a similar pattern of findings, yielding a mean heritability of 0.44. The MISTRA, in conjunction with a reared-together twin study, found that genetic effects on work values and job satisfaction ranged from 0.30 to 0.35. Interestingly and importantly, intrinsic job satisfaction (personal values and interests) showed genetic effects, in contrast with extrinsic job satisfaction (work situations and standards), that did not (see Segal, 2012, for a review).

Numerous studies have shown that MZ twins tend to display greater within-pair cooperation and social closeness than DZ twins (Segal, 2000, 2011). These findings have emerged regardless of theoretical perspective, research methods, twins' age, and twins' gender. The ability to collaborate successfully clearly underlies success in professional occupations and pursuits, and twins are well positioned to inform knowledge and understanding in this area.

The relevant findings cited above are illuminated by exploring the occupational histories of two sets of female

ADDRESS FOR CORRESPONDENCE: Nancy L. Segal, Department of Psychology, California State University, Fullerton, CA 92834, USA. E-mail: nsegal@fullerton.edu



FIGURE 1.

(Colour online) A: Identical twins Hollie (left) and Heather Overton, Photo credit: Abraham Bascon. B: Fraternal twins Susan Hosage (left) and Sandra Sellani; Photo credit: Chuck Gloman.

twins, one set monozygotic (MZ) and the other set dizygotic (DZ). It was of particular interest to consider the ways in which each twin worked together with her respective co-twin and to consider how this information might assist non-twin collaborators. Both twin pairs include one member who is a professional writer and the other who enjoys writing; in fact, the co-twins in question have worked together on various literary projects. Both sets were identified in April 2017 via Literary Orange, a festival of books held annually in Newport Beach, California. Only one twin from each pair was present at the event, and both of these twins served as panelists, as did I, albeit in different sessions. We

came in contact through the interests and efforts of a festival organizer.

The MZ twins are Hollie and Heather Overton, from Los Angeles, California, and the DZ twins are Sandra Sellani from Newport Beach, California, and Susan Hosage from Wyoming, Pennsylvania. All four twins completed a standard physical resemblance questionnaire to assess their zygosity (Nichols & Bilbro, 1966). Results from the questionnaire confirmed my impressions, based on the twins' physical appearance as observed via Skype interviews and photographs, as well as the twins' self-reported beliefs. The two pairs of twins are shown in [Figure 1](#).

Hollie and Heather Overton

Hollie and Heather were born to a young unwed mother in the Chicago area and adopted at 6 days after birth by an older couple in the area. They were 38 years of age at the time of the interviews. The twins currently live one mile apart from one another, an arrangement that facilitates contact and collaboration. They are the same height and nearly the same weight, but differ in handedness; Hollie is right handed and Heather is left handed, so they are part of the 25% minority of MZ twin pairs who show mirror-imaging effects. Hollie is married and Heather is single.

Hollie began her professional training as an actress, studying for a year at the American Academy of Dramatic Arts in New York City and taking private acting

lessons. She then enrolled at Hunter College in New York City where she majored in English. However, Hollie showed early interests in writing, evidenced by contributions to her school's newspaper and her keeping of a journal which she described as 'a form of therapy'. Before leaving New York for Los Angeles, she also explored screen writing, winning first prize for a short film and earning a 1-year fellowship at Warner Bros. Studios. Hollie then began working as a television writer, but soon turned her attention to crafting a novel. With guidance from a respected teacher, she completed 90 pages — and with encouragement from her twin sister Heather she continued. The result was *Baby Doll* (Overton, 2016), a novel with a twin-based theme that has sold thousands of copies worldwide. She has published a

second novel, *The Walls* (Overton, 2017), and is currently at work on her third.

Heather also attended Hunter College and the American Academy for the Dramatic Arts; however, she gave up acting at the academy to work behind the scenes. Heather describes herself as a ‘closet writer’ and has a book idea in mind; she jokes that there is room for only one author in the family. Heather is employed at Hallmark as a television executive, a job that involves developing new programs as well as some writing, and is a position that she greatly enjoys. Reflecting back, she revealed that her sister Hollie was always aware of her career goals, whereas Heather tried many different jobs until finding the one at Hallmark. She experiences slight jealousy at Hollie’s literary success, but supports her sister completely and accompanies her to most of her book-related events. When asked, Heather defined twinship as always having a best friend who understands you better than anyone else.

The twins’ deep emotional connection most likely underlies their ongoing cooperative project. Their goal is to develop a script for a television pilot and to see it through to production. Because Hollie and Heather live close to one another they can meet, an arrangement that allows them to meet often for hours of ‘brainstorming’. They have a set routine that involves composing an outline, dividing up the scenes and then discussing them. According to Heather, these sessions are congenial as long as each does not ask her sister ‘Does this make sense?’, a question that both find annoying. Heather claims that it is not necessarily easier to work with her twin than with other people, but that working with Hollie does *not* feel like work. Hollie echoed many of these sentiments, as she emphasized her sister’s writing talents.

As close as they are, Hollie values her independence, which partly explains why she left New York City ahead of her sister. She worried that others would not find them each ‘interesting’ except for the fact that they are identical twins.

Hollie’s novel *Baby Doll* explores the relationship and sacrifices made by identical separated twin sisters. Heather read through the drafts of *Baby Doll* prior to submission before realizing that one of the twins in the book was modeled after her. ‘I am Abby!’ she said. This was Hollie’s favorite moment . . .

Sandra Sellani and Susan Sellani Hosage

Sandra and Susan are 58-year-old DZ twins. They were raised by a large Italian family in a small town in eastern Pennsylvania. Susan still lives there, but Sandra moved to southern California about 30 years ago and remained there. Living on opposite coasts far apart from one another is not welcome for either of them, but Sandra loathes the Pennsylvania weather. However, the twins get together several times each year and are in frequent contact by telephone (every Sunday) and e-mail. They are of the same height, nearly the

same weight and both are right handed. Sandra was married, but is now single and Susan has been married for 27 years.

Sandra is a brand strategist (someone who promotes a particular brand and develops a strategy for doing so), marketing consultant, and the author of a 2007 book titled, *What’s Your BQ? Learn How 35 Companies Add Customers, Subtract Competitors, and Multiply Profits with Brand Quotient* (Sellani, 2007). She has also co-authored a cookbook with her sister, as described below. Sandra has, however, worked in healthcare and real estate. She transitioned from omnivore to vegetarian at age 25 and eventually to vegan at age 50. These dietary decisions were in reaction to a friend’s animal advocacy, coupled with her own love of animals.

Susan has worked all her life in business, particularly management, strategic planning, and human resources. She has also been a member of the graduate faculty at Misericordia University and an instructor in classes sponsored by the Society for Human Resource Management via the University of Scranton’s Professional Development Center; thus, her career has been less varied than that of her twin sister. Susan is neither a vegan nor a vegetarian, but under her sister’s influence she has reduced her intake of meat.

Sandra and Susan have different but complementary personalities. Both consider themselves introverts, but according to Sandra, Susan is the leader for social events occurring within the family. In contrast, Sandra prefers time alone or associating with just one friend. But when they were young children, Sandra did the talking for them both.

These DZ twins completed a 2017 cookbook titled *The 40-Year-Old Vegan: 75 Recipes to Make You Leaner, Cleaner, and Greener in the Second Half of Life* (Sellani & Sellani, 2017). Speaking with each twin separately conveys the impression of extraordinary fit in their allocation and completion of work-related tasks, somewhat more typical of MZ twins. The cookbook is actually a creative compilation of recipes the twins recall from their childhood days, but re-crafted for vegans. The book was Sandra’s passion, but Susan was particularly good at recalling the different recipes and the entertaining anecdotes behind them. According to Susan, Sandra had the final say as to the book’s content and she was very comfortable with that. They share equally in book royalties. Most significantly, the twins encountered no work conflicts during the writing of the book — Sandra kept her twin fully informed of developments along the way and Susan admitted that ‘it was hard to improve on perfection’. Despite Susan’s married name (Hosage), they used the same last name (Sellani) on the book cover to emphasize their twinship.

Both twins greatly value the relationship they share. For Sandra, being a twin means always having a best friend to support you. Susan agreed, noting that twinship was a buffer against various traumatic life events, such as when both twins had their tonsils removed as children. She also admitted that she would have been lonely growing up as

a singleton with two older brothers. The twins were in 'healthy competition' during their childhood and adolescent years and enjoyed having a constant study companion. Today, they enjoy working together as well as independently.

This past year Sandra and Susan went to their high school reunion together. Susan would not have attended this event if her twin sister Sandra had not been with her. Sandra affirmed that the reverse was also true.

There is little question that the shared interests, talents, and values of these MZ and DZ twin pairs have enabled each set of co-twins to work successfully together toward a common goal. Beyond that, their personalities and tem-

peraments are highly compatible and their relationships are close and trusting. This is not surprising with reference to the MZ twins Hollie and Heather, but is more striking in the case of the DZ twins Sandra and Susan. This particular pair reminds us of the considerable within-pair behavioral resemblance and social relatedness that is possible across DZ twin pairs. It appears that knowledge of one's own abilities and respect for those of one's co-twin, as well as twin pair loyalty, enabled these non-identical twin sisters to be productive and to anticipate future projects together. Clearly, both pairs highlight the ingredients necessary for collaboration in workplaces, on sports fields, and in academic settings.

Twin Research

Molar Pregnancy

Molar twin pregnancy is a rare condition (1 out of every 1,000 pregnancies) that involves an abnormal placenta caused by a problem during fertilization. In a complete molar pregnancy, the egg is empty so no zygote is formed, but the placenta grows and produces the pregnancy hormone human chorionic gonadotropin. In a partial molar pregnancy, there is a mass composed of abnormal cells and an embryo with birth defects that is overcome by the cell mass. Very rare cases involve twin conceptions comprised of a normal twin and mole; however, the normal embryo does not survive the cell growth (American Pregnancy Association, 2017).

An unusual case report from Iran described a molar twin pregnancy consisting of a triple X fetus and mole (Pourali et al., 2017). The pregnancy, conceived by a 22-year-old mother, was referred to the Mashad University Hospital at the 17th–18th gestational week following severe vaginal bleeding. Amniocentesis had been performed at the 15th gestational week, revealing a fetus with the genetic anomaly. A hysterectomy followed and this fetus, as well as a hydropic and vesicular placenta, were delivered. It was recommended that future cases rely on amniocentesis and radiological examination to differentiate a molar pregnancy from unexpectant vaginal bleeding. Note: A hydropic placenta is marked by cystic spaces and is often enlarged (Radiopaedia, 2018); large numbers of extracellular vesicles can be seen in both healthy and abnormal placentae (Tong & Chamley, 2015).

Social Support

The first twin study to examine genetic effects on perceptions of social support and strain in various close relationships was conducted by Kutschke et al. (2017). The sample included 5,288 Norwegian twins between the ages of 40 and

80 years, organized according to zygosity and sex. The data were collected via questionnaires used in a previous large-scale study. The eight measures of interest were social support and strain in reference to the co-twin, spouse, family, and friends.

Genetic effects were detected for all measures, with the exception of family strain in males. In addition, shared environmental influences were found for support and strain within the twin pair. Covariation of social support and strain was suggested by the greater MZ cross-twin, cross-trait correlations, although the overlap in confidence intervals urges cautious interpretation. Overall, outcomes from this study confirm previously reported findings that MZ twins experience greater social closeness than DZ twins, and that twin siblings are generally closer than non-twin siblings.

Conjoined Twinning

Surgical experiences with three pairs of conjoined twins were described by physicians in India for the purposes of describing: (1) the different types of conjoined twinning, (2) the role of imaging techniques, and (3) the management of these challenging twin pregnancies (Mathew et al., 2017). The three pairs in question were cephalopagus (the two faces and the torsos are joined from the top of the head to the umbilicus), thoracopagus (the twins are joined face to face from the upper thorax to the upper abdomen), and omphalopagus (the twins are joined at the umbilicus area and frequently joined at the lower thorax). There are, however, eight types of conjoined twins; a classification table including the various types is provided in the article, as is an informative figure depicting each of the eight types.

The authors emphasized the importance of antenatal imaging for the early diagnosis of conjoined twins. Successful surgical separation requires a diverse team of

specialists in radiology, obstetrics, and pediatric surgery. Three-dimensional printing is a recent tool that may assist surgical planning, thereby reducing morbidity and complications. Counseling for families is also a requisite for favorable outcomes.

Immune Discordance

Systemic lupus erythematosus (SLE) is an autoimmune disorder whose genetic components are not well understood.

A recent case study of MZ twins discordant for SLE compared the co-twins' *de novo* mutations and copy number variations (CNV) to determine whether there were explanatory differences (Chen et al., 2018). It appeared that CNV alterations in pathways associated with SLE were discovered between the twins and could be linked to their disease difference. Unfortunately, details about the twins (e.g., age, sex, and health histories) were not provided in this otherwise interesting and important paper.

Headlines

Twin Politicians

Identical twin sisters Monica Sparks and Jessica Ann Tyson share interests in running for public office in the state of Michigan (Melore, 2018). The twins claim that their early painful separation from their mother and their rearing in foster care motivated them to perform good deeds for Kent County — Monica is running for county commissioner in the 12th district and Jessica is running for the same position in the 13th district. Despite their similarities, the twins' political affiliations are completely opposed — Monica is running as a Democrat and Jessica is running as a Republican. Furthermore, each twin is endorsing her twin sister's opponent in their respective political races. This situation has deprived each twin of her customary 'major cheerleader'.

Extant twin research has shown genetic influence on political attitudes and ideologies, with a more modest effect on party identification (Alford et al., 2005). The Sparks twins are an unusual deviation from these findings. The reason behind their different affiliations is unknown, but could be driven by the need for one or both twins to differentiate from their relationship to some degree. (However, the twins appeared on live television and relations between them appeared amicable.) This is not the first case of identical twin politicians to assume different perspectives — Don and Ron Mosbaugh ran for county coroner on opposing parties, as discussed in an earlier article in *Twin Research and Human Genetics* (see Segal, 2008).

Multiple Birth Marriages

Identical twin half-sibling families are not uncommon given that they result when identical twins simply marry two unrelated individuals. However, the relative rarity of marriages involving two identical twin pairs is newsworthy. The latest foursome to attract national attention includes Krissie and Kassie Bevier, and Zack and Nick Lewan, from Grass Lake, Michigan. Kassie and Nick became acquainted in a psychology class at Grand Valley State University when their professor asked if there were twins in the class;

both Kassie and Nick raised their hands. The two were drawn to one another as a result, and all four twins went out together for the first time to a church service. The relationships grew, eventuating in two weddings that took place one day apart, on August 3rd and 4th, with a joint celebration on the second day (Associated Press, 2018).

The Bevier twins are both doctoral students in physical therapy. The Lewan twins have somewhat different occupational interests, with one twin working toward a master's degree in mental health counseling and the other twin employed in vegetation management. Collectively, these two twin pairs exemplify the similarities and differences in job choice described above; of course, conclusions about factors affecting professional pursuits must be made from large twin samples rather than from individual pairs.

Double marriages between identical twins have the potential to reveal considerable insight into partner choice. Experience has shown that identical twins are not generally attracted to their co-twins' partner, and that non-twins who marry identical twins are generally not attracted to their spouse's co-twin. Subtle differences in manner or appearance can be linked to considerable differences in mate selection (Segal, 2005).

Guinness World Record

New Trier High School in Northfield, Illinois now holds the Guinness World Record for the most twins and most multiples in a single academic year at one school (Hooper, 2018). In attendance are 44 sets of twins and 1 set of triplets, a record that nearly doubled the previous one of 24 sets of twins enrolled at the Highcrest Middle School, in Wilmette, Illinois; twins Luke and Ryan Novosel had applied for the earlier record.

It should be noted that many of the twins who now attend New Trier previously attended the Highcrest school. As such, there does not appear to be anything remarkable about Illinois when it comes to twinning frequencies. In fact, the state with the highest twinning rate is

Connecticut, with more than 41/1,000 twin births as assessed during the years 2014–2016 (Statistica, 2018); the current United States twinning rate is 33/1,000 overall (Martin et al., 2015).

Museum of Memory and Human Rights

I attended the XXIV Biennial Meeting of the International Society for Human Ethology (ISHE), held in Santiago, Chile, September 3–7, 2018. There was an opportunity to visit the Museum of Memory and Human Rights (Museo de la Memoria), established to inform visitors of Chile's horrendous human rights violations during the Pinochet dictatorship, September 11, 1973–March 10, 1990. A huge wall is covered with photographs of victims who were tortured and killed, with some empty spaces reserved for those still to be identified. I wondered if there were twin pairs among them in which one, both or neither survived. My guide, Francisco San Martín, graciously agreed to research this question for me and I had an answer when I returned home.

The story of one twin pair was provided, but according to a museum official there were 'few cases'. I suspect, however, that there were others, given the estimated number of 38,000 victims (BBC News, 2011), and I encouraged the staff to conduct a search by birthdays. The known twins are Iván and Mireya Pérez Vargas, the fifth and sixth children of Don Osvaldo Pérez Sánchez and his wife Otilia Vargas. Iván and his twin sister Mireya were 21-year-old students at the University of Chile when they were killed in a raid by the DINA (National Intelligence Directorate) on February 24, 1976. They had been hiding from attempts at annihilating their parents and four older brothers due to their family's ties to the MIR (Movement of the Revolutionary Left). The twins' remains were eventually discovered by a priest and a lawyer of the Vicaría de la Solidaridad (Vicar of Solidarity) and buried in the General Cemetery (Museum of Memory and Human Rights Archives, 1999).

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