

## Two Monozygotic (Identical) Twin Pairs Discordant for Gender Identity<sup>1</sup>

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*Two pairs of monozygotic twins discordant for gender identity are described. The first set are 8-year-old males, one of whom enjoys doll play, cross-dressing, and taking the role of a female in fantasy games. His brother shows no feminine behavior, enjoys sports, and is more masculine in gestures and speech. The second set are 24-year-old females, one of whom wants to undergo sex-change surgery to male status. Her cotwin is a feminine woman desirous of marrying and bearing children. Differential childhood experiences are described for the cotwins. These highlight environmental influences, which may contribute to variances in masculinity and femininity, when genetic influences are held relatively constant.*

### INTRODUCTION

Twin studies hold a venerable place in the history of psychiatric research into psychosexual behavior. Investigation has generally focused on concordance rates in an effort to delineate the extent of genetic loading behind various patterns of behavior (e.g., Kallman, 1952). Less attention has been paid to studying monozygotic twins discordant for a behavior state in an effort to isolate critical experiential variables in a system in which genetic contributions are held relatively constant.

Various theories of the etiology of atypical masculinity and femininity development have been postulated. They range from the purely postnatal environmental to the purely prenatal neuroendocrine. One focus has been on the early mother-child interaction. For instance, an excessively symbiotic relationship between mother and infant son, remarkable for the degree of body contact, coupled with the relative physical and psychological absence of father, has been seen as promoting a profoundly feminine identity in a young male (Stoller, 1968). At the other end of the theoretical spectrum, the influence of androgen in organizing the prenatal central nervous system,

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in a manner analogous to its differentiation of the peripheral reproductive system, has been emphasized (Philbert, 1969). This has evolved from the finding that behaviorally masculinized female rhesus monkeys result following exposure *in utero* to excessive male hormone (Young *et al.*, 1964), and male-to female transsexualism has occurred in patients with a presumed male hormone deficiency, usually persons with Klinefelter's syndrome (Baker and Stoller, 1968).

Twin studies of atypical sexuality have generally been concerned with homosexuality. During recent years, transsexualism, another anomaly of psychosexual development, differing in many respects from homosexuality, has been described (Benjamin, 1966; Stoller, 1968; Green and Money, 1969). Transsexuals are anatomically normal people who nonetheless feel that they are members of the opposite sex and desperately want surgical procedures to bring their body into conformity with their self-image. They report behaving as persons of the opposite sex since early childhood. As children, they strongly prefer the dress, toys, activities, and companionship of opposite-sexed children. During adolescence, they consider their sexual attraction to anatomically same-sexed persons as heterosexual, in keeping with their own cross-gender identity. During adulthood, they begin living socially in the opposite-sex role. With increasing ease they find endocrinologists who will give them contrasexed hormones, to modify secondary sex characteristics, and surgeons who are willing to modify their reproductive structures—the “sex-change” operation.

Though many hundreds of transsexuals have been evaluated, there are no studies reported of monozygotic twins, either concordant or discordant, for this behavioral state.

## CASE MATERIAL

### Twin Pair 1 (Reported by R. G.)

The first twin pair are 8-year-old males. One was referred for evaluation of feminine behavior which included cross-dressing, doll play, taking the role of a female in games, and an avoidance of rough-and-tumble boyhood play.

The twins are monozygotic with more than 99% probability. The total ridge count on ten digits for both boys is 192. The probability of finding this in dizygotic twins is 0.25%. Both boys have identical findings for the following red cell antigens: ABO, Le, Rh, Go, MNSs, Fy, Lu, Kk, Jk, P, Vel. Phosphoglucomutase, haptoglobin, 6-phosphogluconate dehydrogenase, and adenylate kinase electrophoretic types are also identical in both boys. Karyotyping of each twin reveals 44+XY chromosomal configuration.

### *General Behavioral Description*

*Doctor:* How different are the two boys in regard to masculinity?

*Mother:* Very. First of all with actions. Frank, Jr. (masculine) walks like a clod hopper. Paul (feminine), on the other hand, walks rather feminine. He is on the prissy side. He has a feminine ring to his voice. He is like a female when he gets upset. He thoroughly enjoys playing with dolls.<sup>4</sup> He and

<sup>4</sup> Data from a series of 15 feminine and 15 masculine boys observed via a one-way mirror in a playroom with a variety of toys verify parental reports of feminine boys' preference for doll play. Boys described as feminine spent more time playing with the doll to a statistically significant degree (Green *et al.*, 1972a).

his sister can play day upon day upon day. His brother will deliberately go out and get into a football game or anything with the older boys in the neighborhood. Paul will still dress in women's clothes, but he's getting out of the habit because he knows it really aggravates us. He will put hair clips in his hair. When they play house, Frank is always the father and Paul is always the mother or sister.

### *Early Differences*

At birth, the premasculine boy was named for his father (Frank, Jr.).

*Doctor:* Did they look different at birth?

*Father:* Paul (feminine) looked a great deal heavier and rounder—a good looking baby; the other like a spider monkey.

*Mother:* Paul (feminine) was always the cuddlier of the two boys. You could hold him. You tried to hold Frank (masculine), and he would do everything but bite you.

*Doctor:* Was one twin more active?

*Mother:* Up to 4 months there was nothing you could identify. After that I would say Frank (masculine) over Paul (feminine). When they were still in the playpen, which puts them a little under a year, Frank reached over and bit Paul on the ear something fierce, and Paul didn't do anything—he just curled up.

*Doctor:* Were there as many times that Paul was dominant?

*Mother:* I would say it was almost equal.

Onset of behavioral differences was before school age:

*Doctor:* When did you start noticing a difference?

*Mother:* Four, four and a half. Paul (feminine) preferred the friendship of the little girls in the neighborhood and enjoyed playing with dolls and took more of an interest in his sister than his brother. His brother was becoming very masculine at the time. Paul didn't want to participate in sports he'd much rather clean house. I don't know whether it was a preference for me or for what I did. The fun of getting all dressed up or putting on makeup or doing dishes or grocery shopping. This seemed to be the things he preferred to do; I was the one who did them.

A medical illness beginning at age 3 intervened and radically modified the role the parents played with each twin. The mother drove Paul (feminine) to the hospital for an extended period of evaluation and treatment lasting 2½ years. He had contracted glandular tuberculosis involving lymph nodes of the axilla and neck.

The father describes the difference in his relationship with the boys:

*Father:* I think the reason I kind of laid off a lot of sports with Paul (feminine) was because he was down here in the hospital, and I had a chance to be with Frank (masculine) more and tried to keep him occupied during these periods of time. The reason I didn't push Paul that much was because his little arm was bad at the time, and it was hard to make him do it. . . . I gave up on him until the last couple of years. . . . I was upset because he didn't want to do it.

*Mother:* Paul (feminine) was always invited to be included with his brother to participate whether it was kite flying or basketball or baseball, but he didn't. . . . All the females in the family said you can't do that to him—that isn't his cup of tea.

He underwent surgery on his right axilla.

*Father:* The operation affected his arm, and he wasn't quite as active—everything has been toward the fact that maybe you can't push him like that because he's that way.

*Mother:* It gave him an excuse for not competing with his brother. This is where his aunt came into the picture—"Well, he can't throw a ball—you can't expect him to throw a ball like Frank because he has a hurt shoulder."

Mother describes some differences in her relationship with the boys:

*Mother:* Frank (masculine) didn't necessarily want or need the affection. When I say need, I mean didn't crave it like Paul (feminine) did because Paul found that being in a hospital he got waited on, things happened his way. When he got home things happened his way; he could play on this—the fact that he had been sick.

**Table I.** Outgoing and Incoming Feelings Described by Twin Boys on the Bene–Anthony Family Relations Test

	Paul (feminine)		Frank (masculine)	
	Mother	Father	Mother	Father
Outgoing positive	7	5	3	8
Incoming positive	8	2	5	8
Outgoing negative	1	1	1	0
Incoming negative	1	4	4	2

### *Psychological Testing*

Sex of first drawn person on the Draw-A-Person Test was *female* for Paul (feminine) and *male* for Frank (masculine). Evidence exists that the sex of the first drawn person when children are requested to “draw-a-person” is reflective of gender identity (Jolles, 1952). On the It-Scale for Children (Brown, 1956), Paul (feminine) scored 38 and Frank (masculine) 72. Published norms for boys and girls indicate that Paul’s score is in the middle of the normal range for girls and Frank’s score is in the middle of the normal range for boys.<sup>5</sup> On the Bene–Anthony Family Relations Test (Bene and Anthony, 1957), more positive outgoing and incoming feelings between father and son were described by Frank (masculine) and more positive outgoing and incoming feelings between mother and son were described by Paul (feminine). With respect to negative feelings, more were described between father and Paul (feminine). These data are shown in Table I.

The twins were also administered the Parent and Activity Preference Test (Green, unpublished). The test is comprised of 28 incomplete series of pictures. The first two cards in the series depict a mother engaged in an activity and a father engaged in an activity. The activities may be masculine, feminine, or gender neutral. The child completes the series by selecting a third card from two choices; one shows a boy having joined the mother in that activity and the other depicts a boy having joined the father. Paul (feminine) chose the “boy and his mother” card 17 times, Frank (masculine) only three times.

### **Twin Pair 2 (Reported by R. J. S.)**

The masculine cotwin of the second twin pair is a 24-year-old, physically normal twin with a boyish-masculine appearance. This is due to her slim and tall build, her masculine haircut, and her clothes, which are very mannish but not literally those of a man. Her carriage and walk are unremarkably masculine (or would be in a man) without either a feminine tinge or the exaggeration seen in some homosexual women. She was referred by the Student Health Service because she requested a “sex transformation,” about which she had recently read.

<sup>5</sup> Data from a series of 30 feminine and 25 masculine boys indicate that both the Draw-A-Person Test and the It-Scale for Children can discriminate groups of clinically masculine and feminine boys to a statistically significant degree (Green *et al.*, 1972b).

The likelihood the twins are monozygotic is greater than 99%. The fingertip total ridge count in one is 64, in the other 61; the probability of this being found in dizygotic twins is 0.27. Blood samples were analyzed for gene markers. Phosphoglucumutase electrophoretic types and haptoglobin electrophoretic types are identical. White blood cell types also show no differences. The immunoglobulin allotypes (Gm and Inv) are the same in both. Typing for the following red cell types is also identical: ABO, Le, Rh, Go, MNSs, Fy, Lu, Kk, Jk, P, Vel. Both twins have a normal 46+XX female karyotype.

The masculine twin says that as far back as she can remember (which is to age 8) she has had masculine interests and daydreams. This quality was so clear to her family that she and they chose for her a comic-strip character's nickname that was purely masculine, and all thought the name humorously appropriate. Throughout childhood, the patient wanted to dress as a boy; while not doing so, she nonetheless almost never wore dresses but instead has worn clothes that look as much like what boys wear as society would permit. She drove herself to excel in school and so did very well; she also had to excel in sports, and as a result was a fine athlete, fast, strong, and well-coordinated. She wished that she had been born a male and, when constructing daydreams from childhood on, pictured herself always as a masculine, heroic male (boy or man) who loved a feminine woman. She secretly invented for herself (in addition to the male nickname) a strongly masculine name. In college, she fell in love for the first time and lived in an affectionate relationship with a more feminine young woman. When they both learned of the term "transsexual" and of "sex-transformation" procedures, they decided the patient should have such performed so that then both could live openly together in society as male and female.

The patient was born greater in length and weight than her cotwin and has remained the larger throughout life. She has always been physically stronger, has had less physical illness, and was always treated by the family as the tougher. Her twin sister was born with a minor orthopedic defect of the foot requiring treatment for several years. The patient describes her twin sister as having tried to be as interested in sports and other achievements as the patient was, but could not be bothered; she was never sufficiently motivated. Although of equally slim and boyish build and looking as if she could have succeeded as well in athletics, the twin sister gave up competitive yearnings while still in childhood and now rarely plays in any sports and then only at someone else's urging. When they were little, if the masculine twin was losing, she would play harder; her sister, on the other hand, would have a tantrum or refuse to play or even bite her cotwin. The feminine sister was described by the masculine twin as habitually dressing and acting femininely and being accepted by their parents as the feminine one of the twinship, while the patient was always considered with amused pleasure by all the family as the "boy." (There are two younger siblings, both boys.)

The feminine twin was seen two times for evaluation. She appears as she had been described by the patient, and her story does not contradict the patient's, except that the twin sister thinks the patient foolish for thinking herself a male and wanting sex-transformation. This is so alien to the twin sister that she cannot believe the whole story is not invented for effect. The rest of the family takes the story much more seriously, however; their mother, at present borderline psychotic, is so in part from a

sense of guilt that she may have produced this masculinity in her daughter, and when delusional believes her own body is changing in a male direction.

The twin sister dresses femininely; that is, her shoes were not styled equivocally but were the sort worn only by women; her stockings were sheer panty hose; she had on a skirt and feminine blouse; and a touch of makeup (which the patient would not be caught dead wearing) heightened her facial qualities. Both have about the same hair styles, but the differences are diagnostic: The feminine twin's hair has sheen and body to it, the result of a practiced hand and of a steady interest in advertisements selling products that make hair feminine. Her avowed goal in life is "to get married and have five children."

Both ascribe the gender differences to the different ways they were treated from childhood on. Both tell anecdotes in which the masculine twin was encouraged and expected to do household chores such as helping her father roof the house or do concrete and stone work or play as if she were a boy, while the feminine twin was either given feminine jobs or excused from household work. Both recall gifts bought for them by their parents where the feminine twin was given a gift useful in quiet, mothering play and the masculine twin got toys normally given to boys. For instance, on their eighth or ninth birthday, the feminine twin was given a pet bird and the masculine twin a bicycle. Her father chose a boy's bike with the stated reason being that a boy's bike is structurally stronger.

## DISCUSSION

The above case reports do not finally rule out a neuroendocrine or other constitutional theory of atypical gender role development. Monozygotic twins need not have an identical prenatal hormonal milieu, any more than an identical nutritional one; witness the long-recognized differences in birth weight. Intricacies of somatic development do not proceed identically in two persons derived from the same fertilized ovum, or parents of monozygotic twins would be unable to identify each twin on the basis of physical appearance. These case reports do, however, point to the value of exploring postnatal experiences in detail and of guarding against oversimplification which passes over that myriad of experience. To do so would be to ascribe gender behavior purely to a prenatally written neural program.

In twin pair 1, some behavior differences were apparent neonatally. The pre-feminine twin was more cuddly, which may have facilitated more mother-infant contact. Additionally, the prefeminine twin was a more attractive infant. The activity level of the premasculine twin may have been greater, and there is some evidence he was more aggressive. Coupled with these differences in the infant boys, parental attitudes toward the two twins may have differed. The premasculine infant was named for the father.

The critical event appears, however, to be the illness starting at age 3 which modified the role each parent played with each twin. During the years in which gender identity consolidates, one boy was spending considerably more time with his father and engaged in sports and rough-and-tumble play, while the other twin was spending more time with his mother and was differentially handled because of his label as the sick child.

Similarly, in twin pair 2, one twin was chosen by the parents to be the more masculine, and when such behavior appeared it pleased everyone. The other twin was allowed and encouraged to see herself as feminine. Coincidentally or not, the larger and healthier twin was the one treated as a boy.

Thus different early childhood events were experienced by both the male and female cotwins, which were in accord with later manifestations of masculinity and femininity. Cast against a backdrop of similar, if not identical genetic contributions, they provide information on experiential variables which contribute to the development of gender identity.

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