Title: Transsexuality Among Twins: Identity Concordance, Transition, Rearing, and Orientation

Author: Milton Diamond Ph.D.

Published in: International Journal of Transgenderism, 14:1, May 2013, pp 24-38

KEYWORDS: Transsexual, twins, concordance, father, fantasy, sexual orientation, transition, gender identity disorder (GID), genetics, rearing, parents, intercourse, brain, intersex

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**ABSTRACT**

The relative contributions of genetic and environmental factors to the development of gender identity have been debated. Twins were studied that are concordant or discordant for gender identity status in order to provide clarification of this issue. An extensive library search yielded reports of 27 male and 16 female sets concordant or discordant for transsexuality. An Internet bulletin board search and clinical contact requests for participants in a survey of twins in which one or both transitioned located 69 new twin pairs. In addition to asking about matters associated with gender, these new twins were asked about their transition, rearing, and sexual practices. Combining data from the present survey with those from past-published reports, 20% of all male and female monozygotic twin pairs were found concordant for transsexual identity. This was more frequently the case for males (33%) than for females (23%). The responses of our twins relative to their rearing, along with our findings regarding some of their experiences during childhood and adolescence show their identity was much more influenced by their genetics than their rearing.

A letter from a set of identical twin sisters alerted me that one, but not the other, would be transitioning to live as a man and asking if they might be useful in a study of transsexuality. With a background in studying the relationship of twinning and homosexuality (Whitam, Diamond, & Martin, 1993) and uncovering the twins involved in the John/Joan case (M. Diamond & Sigmundson, 1997) as well as having reported on conjoined twins (M. Diamond, 1999) all due to a long term interest in sexual development (M. Diamond, 1965, 2006, 2011a), immediately piqued curiosity and initiated a
search as to previous findings. It became clear that transsexuality among twins had, indeed, been reported but that no directed study of the phenomenon had been done. I accepted the twin’s offer and initiated this study.

This report is both a review of previously reported findings and the result of a specific research effort to find twins among whom one or both had transitioned from their assigned sex at birth to the gender typical of the opposite sex. Aspects of the twinning relation and rearing were also investigated. The findings have relevance to understanding some of the genetic and social contributions toward the transsexual phenomenon. This subject has been the subject of debate for some time (Gooren, 1990; Money & Gaskin, 1970). Initial abstracts of this research have appeared (M. Diamond, 2011b; M. Diamond & Hawk, 2004). New material is also introduced here regarding rearing, sexual orientation, and the transition process.

**METHODS & MATERIALS**

Twin information from Available Sources

An extensive search for citations regarding transsexual twins was conducted using standard reference bases such as the Library of Congress, Medline (TR), the National Library of Medicine, and the Institute of Medicine as well as many others. Also searched were different video and TV sources on the Internet, for example, YouTube, that I thought might lead me to other twin sets. Transsexuality has been defined as transitioning from living in the gender assigned at birth to that of the opposite gender. The condition is also recognized clinically as Gender Identity Disorder or Gender Identity Dysphoria in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American psychiatric Association, 2000). From the literature or survey only twins age 10 years or older were accepted for our consideration, since younger children often have doubts about their sex or gender and express a desire to change their gender but do not follow through (R. Green, 1987; Zucker & Bradley, 1995). For those, not yet fully adult, a clinical confirmation of the desire and expectation that such a transition would occur was accepted as a transition. The search yielded 43 sets of twins from available sources (Tables 1 and 2).

Twins from Survey

Colleagues and transsexual groups were informed of our interest with a request to be notified of appropriate potential subjects. We considered for our study twin persons, male or female, identical or fraternal, within which one or both have transitioned from female to male (FtM) or male to female (MtF). We also advertised our desire to study relevant twins by posting our request for subjects on different Internet websites (see Appendix). Professional colleagues or others who knew of our interest referred subjects to us. Responses came from the United States, the United Kingdom, Australia, and Japan. All subjects who personally responded to our survey were fluent in English. Subject
information from Japan was received from an English-speaking colleague. Our call for new twins resulted in leads to 69 new twin sets. The total study thus reports on 112 sets of twins within which one or both had transitioned from one gender to the other.

**TABLE 1. Sources for Male Twins**

<table>
<thead>
<tr>
<th>Male Monozygotic Twins</th>
<th>Concordance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchersen, P. (1956)</td>
<td>Yes</td>
</tr>
<tr>
<td>Benjamin, H. (1971)</td>
<td>Yes</td>
</tr>
<tr>
<td>Benjamin, H. (1971)</td>
<td>Yes</td>
</tr>
<tr>
<td>English, B. (2011)</td>
<td>No</td>
</tr>
<tr>
<td>Green, R. (2000)</td>
<td>Yes</td>
</tr>
<tr>
<td>Heylens, G., et al. (2012)</td>
<td>No</td>
</tr>
<tr>
<td>Hyde, C., &amp; Kenna, J. C. (1977)</td>
<td>Yes</td>
</tr>
<tr>
<td>Stoller, R. (1976)</td>
<td>No</td>
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</table>

<table>
<thead>
<tr>
<th>Male Dizygotic Twins</th>
<th>Concordance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auge (2007)</td>
<td>No</td>
</tr>
</tbody>
</table>
Heylens, G., et al. (2012) No
Heylens, G., et al. (2012) No
Heylens, G., et al. (2012) No
Maghazaji (1985) No
Vujovic, Popovic, Sbutega-Milosevic, Djordjevic, & Gooren (2009) No

Note: Sources obtained from published or otherwise available media (e.g., TV, Web, or film) in which transsexual twins are mentioned. Individual cases reported within any particular reference are listed separately; e.g., in Gooren et al. (1989), four sets of twins are listed.

*Zygosity not stated. MZ assumed from narrative.

**TABLE 2. Sources for Female Twins**

<table>
<thead>
<tr>
<th>Concordance</th>
<th>Source</th>
</tr>
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<tr>
<td>No</td>
<td>ABC News (2004)</td>
</tr>
<tr>
<td>Yes</td>
<td>Bennett (2008)</td>
</tr>
<tr>
<td>No</td>
<td>Culliford (2006)</td>
</tr>
<tr>
<td>No</td>
<td>Garden &amp; Rothery (1992)</td>
</tr>
<tr>
<td>No</td>
<td>Green &amp; Stoller (1971)</td>
</tr>
<tr>
<td>No</td>
<td>Hammond (1995)</td>
</tr>
<tr>
<td>No</td>
<td>Hewitt &amp; Warren (1996)</td>
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<tr>
<td>Yes</td>
<td>Heylens, G., et al. (2012)</td>
</tr>
<tr>
<td>Yes</td>
<td>Knoblauch, Busjahn, &amp; Wegener (2007)</td>
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<tr>
<td>No</td>
<td>Martin (1981)</td>
</tr>
<tr>
<td>No</td>
<td>Rood (2008)</td>
</tr>
<tr>
<td>Yes</td>
<td>Sadeghi &amp; Fakhrai (2000)</td>
</tr>
<tr>
<td>No</td>
<td>Segal (2006)*</td>
</tr>
<tr>
<td>Yes</td>
<td>Yiu (2012)</td>
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<td>Female dizygotic twins</td>
<td></td>
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<tr>
<td>No</td>
<td>Heylens, G., et al. (2012)</td>
</tr>
<tr>
<td>No</td>
<td>Vujovic, Popovic, Sbutega-Milosevic, Djordjevic, &amp; Gooren (2009)</td>
</tr>
</tbody>
</table>
Survey Questions

The survey asked questions of the twins’ zygosity, upbringing, and gender transition, for example, what was the age at which the first definite feelings were felt that “instead of being in the gender you were raised you should have been of the other gender?” and “at what age did the actual transition occur?” The survey stipulated that transition, for the purposes of the study, meant “when one begins to live overtly and fully committed as a member of the opposite gender regardless whether one has had surgery.” The survey also asked questions regarding how the twins were raised as well as of sexual orientation both before and after the transition. For some of these questions we used a Kinsey-like 0 to 6 scale rating system modified to capture orientation from completely androphilic to completely gynecophilic (Kinsey, Pomeroy, & Martin, 1948).

The survey, with a stamped and addressed return envelope, was mailed to each potential subject pair. The survey consisted of both open- and closed-ended questions with sufficient allowance for additional comments. Responses were not always forthcoming from both members of the twin pair. Most often it was the twin that had transitioned that responded for both. The data presented do not always reflect responses from all our subjects. As is common in survey research, many respondents chose not to answer some questions. Where appropriate, the number of those who responded to any particular question is indicated. When colleagues submitted twin data to us they were often only regarding birth sex, zygosity, and concordance or discordance of transition. Occasionally there was mention of sexual orientation; rarely was there any information regarding the twins’ rearing.

ANALYSIS

Statistical analysis for concordance used the Fisher’s Exact Probability Test (Siegel, 1956) and was conducted in different ways. First, we looked at findings from the bibliography search (Table 3). Second, analyzed were findings from the twin surveys (Table 4), and last we combined the bibliography and survey findings. The combined data pool (Table 5) resulted in information from 39 monozygotic (MZ) male twins, 21 dizygotic (DZ) male sets, 35 MZ female twin sets, and 17 DZ twin pairs. Six sets of twins who responded to our survey were brother-sister pairs who were not included in the total count or statistical analysis.

RESULTS

Twin Concordance and Transition

TABLE 3. Distribution of Responses Among Twins Found in
Combining data from our independent findings with those from past research, 13 of 39 male MZ twin pairs (33.3%) were found to be concordant for transsexual identity and eight of 25 (22.8%) female MZ twins were found concordant. In comparison, concordance between either male or female DZ twins was low or zero (1/38 = 2.6%; Table 5).

Statistical analysis showed that there exists a significant association between concordance and zygosity among males (p = 0.022) and for both sexes (p = 0.001) when combining both bibliographic and survey data. More specifically, within this combined data pool there is a 33.33% concordance among monozygotic male twins compared with a 4.76% concordance among dizygotic male twins. In addition, there is a 28.38% concordance among monozygotic male and female twins compared to a 0.34% concordance among dizygotic male and female twins.

In the six cases of brother-sister twins, two males transitioned to female and four of the females switched to live as men. Notably among our responding twins were three sets who had been reared apart and were concordant in transitioning. One was a male set within which the brothers were separated at birth, another was a set of males separated at age 4, and the third was a female pair separated at 14. Each had independently and unknowingly transitioned and found out about each other’s switch as adults after the gender shift.

Among 31 of the trans respondents, the average age claimed for a first awareness of being raised inappropriately and having a desire to be, or of being, of the “other” gender was 10 years or less for 19 (61.3%), with nine (29.0%) claiming it was before the age of 5. The average age of actual transition, however, was 32 years (Mdn. = 33). The concordant twins in our study did not always transition at the same time. In one case the first twin transitioned at 28, while his brother went male-to-female at 39.

### TABLE 4. Distribution of Responses Among Twins Found in Survey Search

<table>
<thead>
<tr>
<th>Bibliography</th>
<th>Zygosity</th>
<th>Sex</th>
<th>Yes</th>
<th>No</th>
<th>N total</th>
<th>Con</th>
<th>Yes %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>MZ</td>
<td>Male</td>
<td>7</td>
<td>10</td>
<td>17</td>
<td>7/17=</td>
<td>41</td>
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<tr>
<td></td>
<td>DZ</td>
<td>Male</td>
<td>1</td>
<td>9</td>
<td>10</td>
<td>1/10=</td>
<td>10</td>
</tr>
<tr>
<td>Female</td>
<td>MZ</td>
<td>Male</td>
<td>5</td>
<td>9</td>
<td>14</td>
<td>5/14=</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>DZ</td>
<td>Male</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0=</td>
<td>0</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td></td>
<td>13</td>
<td>28</td>
<td>41</td>
<td>13/41=</td>
<td>32</td>
</tr>
</tbody>
</table>

Note: MZ = monozygotic; DZ = dizygotic.
TABLE 5. Distribution of Responses Found in Combined Bibliography and Survey Searches

<table>
<thead>
<tr>
<th>Bibliography</th>
<th>Zygosity</th>
<th>Yes</th>
<th>No</th>
<th>N total</th>
<th>Con</th>
<th>Yes %</th>
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<tr>
<td>Sex</td>
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<td></td>
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<td>11</td>
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<tr>
<td>Female</td>
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<td>21</td>
<td>3/21</td>
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<td></td>
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<td>60</td>
<td>69</td>
<td>9/69</td>
<td>13</td>
</tr>
</tbody>
</table>

Note: Survey also found six brother–sister pairs (two MtF and four FtM) not included in statistical calculations. MZ = monozygotic; DZ = dizygotic.

The survey asked respondents if and when they had discussed their transition with their twin and how they would characterize the discussion. Of the 30 respondents who chose to answer the question, 11 indicated they had discussed their gender shift prior to their transition but that it might have been shortly before having surgery. Five respondents indicated they had such a discussion at about the same time the transition was occurring, and another six stated they had had ongoing discussions before, during, and after the gender shift. Nineteen of 30 (63.3%) said they felt that their twin was supportive and that the talk was congenial. In contrast, five (16.7%) indicated that the talk was tense, confrontational, or negative. Two males indicated their twin tried to convince them not to change.

While overall the nontransitioning twin was supportive, comments added by the twins were informative. A few mentioned that portions of the discussion were in regard to how the rest of the family, particularly the father would react. Another twin was concerned about the community’s reaction in the small town.
in which they lived. Two wrote of the “grieving” or “bereavement” their twin experienced. One nontransitioning twin questioned why his brother was transitioning so late in life, at age 43. One FtM commented that her sister was concerned about how the transition of “favorite aunt” to uncle would affect her daughter. The tenor of most of the discussions perhaps can be sensed from the comment of one FtM who wrote how, at first, her sister was against the move, but, after coming to understand the depth of feeling she had for transition, helped her through the whole procedure.

One survey question regarding transition asked, “Do you think your sexual attraction for a male or female sexual partner was involved in your decision to transition?” Respondents could answer “Yes” or “No” and add a comment. Only two males thought it might have been involved but none of the other males or females thought so. Many did not even see how the question pertained to them. One female commented she could have remained a “happy lesbian” if she hadn’t transitioned. One male commented that he was worried about his wife’s concern that their relationship would be seen as that of two lesbians.

Rearing

One question of the survey asked respondents “Which do you find most true?” and gave respondents subsequent choices to indicate if they thought they were (a) raised unequivocally as members of their birth sex and without allowance for cross-gendered behavior, (b) in accordance with their birth sex with some permissiveness, or (c) without any gender restrictions. Among 25 male respondents, 14 (56.0%) indicated they had been raised unequivocally as boys without any allowance for cross-gendered behavior. This was comparably true for only four of 20 (20.0%) of our female respondents. Four males (16.0%) indicated their parents were permissive of their behavior, while 50% of the females indicated their parents were permissive of their gendered expression, allowing crossgendered behavior. Only two of the respondent males (8.0%) and four of the females (20.0%) thought their parents were not at all restrictive regarding gendered behaviors.

A comparable set of questions asked more specifically if the respondents thought their parents reinforced male or female identity and if cross-gendered behavior, in general, had been encouraged or discouraged. Basically almost all of the males and female respondents felt that their parents had reinforced the identity associated with their birth sex and discouraged cross-gendered behaviors. Three males and three females, however, did think their parents encouraged cross-gendered activities. Of the 13 males who responded to this specific question, nine (69.2%) felt that their parents had discouraged cross-gendered activities; three did not think so, and one thought his parents neither encouraged nor discouraged such behaviors. Of the 10 females who responded, one indicated that a male identity had been reinforced and male behavior was encouraged. Six of the remaining nine females (67.7%) felt that female identity was reinforced but that cross-gendered behavior was not discouraged. Among 23 respondents to a question that asked specifically “Do you think your parents
encouraged cross-gendered behavior?” three females and two males answered yes; all the rest (78.3%) said no.

All survey participants were asked, “Were you and your twin treated similarly?” The answer choices were (a) “All the time,” (b) “Most of the time,” (c) “Some of the time,” and (d) “Rarely.” To this crucial question that was answered by 19 males and 19 females, four females responded “All the time,” and all but one of the remaining females (73.7%) responded “Most of the time.” All of the males except one (94.7%) responded “Most of the time.” The one exception responded “Some of the time.” The single male who was separated at birth from his brother left this question blank, with a comment regarding his separation. His brother had committed suicide subsequent to transition and prior to having received a survey.

Asked if their parents had expressed an indication that they wished the child had been born of the opposite sex, two of 15 males (13.3%) thought their parents would have preferred that they had been girls. Five of 14 female respondents (35.7%) thought their parents would have preferred that they had been males. Three of these five were the same three whose parents had encouraged male behavior. The remaining 22 respondents to this question (75.9%), however, indicated that they thought their parents had no preference regarding their birth sex.

**Sexual Orientation (Fantasy and Actuality)**

The survey, in four separate questions, inquired about aspects of sexual practice and sexual orientation (SO) in fantasy and actuality. One question read, “At present which best describes your actual sexual partners during any type of actual intercourse?” This wording of “any type of actual intercourse” was used in an attempt to be inclusive of those lesbians or others who might have considered for intercourse, only instances of “penis in vagina.” The survey asked of both fantasy and actual practices, probing whether and how their practice and orientation might have changed before and after their transition.

Among 15 of 25 transitioning males that responded to this question, six reported that, prior to transition, all or almost all (40.0%) of their fantasy partners had been males, three indicated that all had been female, and four reported that the majority were female but a few were male. Two respondents reported that in their fantasies they had about an equal number of males and females. After transition, in fantasy, 10 (67.8%) of these same male respondents stated that all or almost all partners were males; three males reported having only female partners in fantasy; and two reported that they were no longer sexually active.

Regarding actual partners in intercourse, among the 14 males who responded, 10 (71.4%) indicated that all of their actual partners, prior to transition, were female; two (14.3%) had only had male partners, and one indicated that most of his partners were female but more than a few had been male. One male indicated he did not have intercourse prior to transition.
Regarding actual partners in intercourse after transition, only 11 males responded. Among these 11, five indicated that all of their partners (45.5%) had been male, three (27.3%) indicated that all of their partners had been female (the same three that had only females in fantasy), one indicated that his partners had been mostly male with more than a few females, and one indicated that his partners had mostly been female with more than a few males.

The female-to-male respondents were asked the same questions as those who had transitioned male-to-female. Of the 20 FtM persons in our survey that answered this question, 14 responded regarding their fantasy partners. Ten (71.4%), said that prior to transition all or almost all of their fantasy partners had been female, two said their fantasies were equally about males and females. Of this same group, one claimed that her fantasy partners had been exclusively male (her real boyfriend), and one claimed that her fantasy partners had been mostly male with a few females.

After transition, the fantasies of seven FtM respondents (50%) were reported as exclusively or almost exclusively of females, while three said their fantasies were equally about males and females. Among the other FtM responders, two reported that their fantasy partners were usually of males with more than a few females, and two claimed that they fantasized mostly about males with a few females.

Of the actual partners of 14 FtMs who responded to this question, one indicated that prior to transition she had only had a single male partner (her boyfriend, mentioned above); two indicated that their partners had most often been male but they had a few that were female. Another two respondents indicated that their partners had been most often female, but they had more than a few that were male. Eight of these FtM twins (57.1%) reported that their actual partners prior to transition were exclusively or almost exclusively female. One FtM indicated that her single experience with actual intercourse was a rape after her transition (at age 27) by a male who thought she was another homosexual male.

After transition the FtMs responded as follows: seven (50.0%) indicated that all of their actual partners had been female, and another five (35.7%) reported that almost all had been female with a few males. One FtM indicated that her actual partners were as often male as female.

The survey did not specifically ask respondents about the sexual orientation of their twin. From the comments and answers received, my impression was that those concurrent in transitioning were also concordant in sexual orientation. The majority of the MZ transitioning twins, both male and female, had siblings who were also concurrent in sexual orientation. The siblings of the DZ twins, however, were more often heterosexual than homosexual. One MZ male who transitioned commented that his brother was a “straight” cross-dresser, and one MZ FtM wrote that her sister took male hormones and was a “masculine dyke.”
Twin Concordance and Familiarity

It is clear from the findings that there is a greater likelihood of concordance for transsexuality among males than among females and a greater chance of concordance among monozygotic twins than dizygotic twins. These findings are consistent with those reported previously (M. Diamond, 2011b; M. Diamond & Hawk, 2004) and comparable to those found in familial studies and reports of cooccurrence of gender identity disorder within families as reported by others. In a report that appeared while this paper was in press, Heylens et al. (2012) reported that of 23 MZ female and male twins they reviewed, nine were concordant for gender identity disorder (GID; 39%), while none of their 21 DZ twins were concordant. The investigators concluded, “These findings suggest a role for genetic factors in the development of GID.” Their results and those reported here are quite similar. The results of these studies combined, at least for this issue, appear to show that Internet survey data, when coupled with clinically reported material, can provide representative data. Both studies reinforce the significant role of genetics in transsexuality.

Gomez-Gil et al. (2010) in their sample of 995 consecutive transsexual probands (677 male-to-female and 318 female-to-male) report 12 pairs of transsexual nontwin siblings (nine pairs of MtF siblings, two pairs of MtF and FtM siblings, and one pair of FtM siblings). These investigators claim that their data indicate that the probability that a sibling of a transsexual will also be transsexual was 4.48 times higher for siblings of MtFs than for siblings of FtM transsexual probands, and 3.88 times higher for the brothers than for the sisters of transsexual probands. Moreover, the prevalence of transsexualism in siblings of transsexuals (1/211 siblings) was much higher than the range expected according to the prevalence data of transsexualism in Spain (the country of their study). Their study strongly suggests that siblings of transsexuals have a higher chance of being transsexual than the general population and that the potential is higher for brothers than for sisters of transsexuals, and for siblings of MtF than for FtM transsexuals. An excellent review paper by Veale, Clarke, and Lomax (2009) offers a host of references of papers dealing with transsexual familiarity and, while concentrating on the role of genetics and prenatal hormones, also touches on the actual and possible aspects of the rearing environment. They conclude there appears to be a significant role for biology in transsexualism but conservatively caution that attention is given to rearing practices.

Other reports have also shown familial transsexualism. Stoller and Baker (1973) reported on a family in which two brothers transitioned to live as androphilic sisters, and Stoller and Moseley (1974) reported on three siblings with GID. Green (2000), in addition to his report of monozygotic twins that were concordant for transsexualism, simultaneously reported on nine other siblings or parent-child pairs concordant for gender identity disorder. I
personally know of three sets of father and son pairs that are concordant for transsexuality. There are no known studies that report any environmental influences significantly able to induce such findings. Results of testing for GID among the large twin data set of Australia found, “The model that best described the data included a significant additive genetic component accounting for 62% of the variance and a non-shared environmental component accounting for the remaining 38% of the variance ... Overall, the results support the hypothesis that there is a strong heritable component to GID” (Coolidge, These, & Young, 2002, p251). Bailey, Dunne, and Martin using that same data set concluded, “[C]hildhood gender nonconformity was significantly heritable for both men and women” (Bailey, Dunne, & Martin, 2000, p524).

**Transition**

The Internet has many personal reports and stories of transsexuals transitioning from one gender to another with personal recounting of it. Almost all of these tales depict aspects of the physical changes involved. None appears to show or discuss the emotional interaction this move engenders with others. One documentary movie, Red Without Blue, does chronicle the close, yet sometimes strained, relationship between identical twins Mark and Alex as Alex undergoes transformation into a woman (Sebold, Sills, & Sills, 2006). And some books such as “Becoming a Visible Man” by FtM J. Green (2004) do so.

Our survey probed this area. In a number of cases the transition was seen as disruptive of the usual relationship between the twins. Two males did try to dissuade their brothers from transitioning. Most of the nontransitioning twins, however, were supportive. The majority of the co-twins were aware of the turmoil and distress their sibling was undergoing or had gone through. One male said he would get a sex change even if he “was seen as the ugliest man or woman in the world.” The nontransitioning twin often was concerned about potential problems for the brother or sister with expressed concerns ranging from religious aspects to legal issues. Two of the siblings expressed shock and surprise; others said they saw it coming. As this paper was in preparation, an article by Riley, Sitharthan, Clemson and Diamond (2011) appeared reporting some of the difficulties of the transition process that parents experience dealing with a gender-variant child going through transition. Also, on Mother’s Day of 2012, a new book entitled “Transitions of the Heart” emerged (Pepper, 2012). This book contains a collection of writings from mothers expressing the struggle and difficult experiences of dealing with a transsexual or gender variant child. It is obviously a process needing further study. A book by Segal (2000) gives a broad view of the close and involved relations among twins.

**Rearing**

While Heylens et al. (2012) attended to medical records, case reports, and published aspects of rearing that might have influenced individuals to transition, this study directly asked the survey respondents involved different
features of their rearing that they thought might have been significant in their gender shift. More than half of the male respondents claimed that they had been brought up unequivocally in accordance with their birth sex without allowance for cross-gendered behavior. Indeed, nine males, essentially two of three that answered the related question, thought their parents actively discouraged cross-gendered behaviors. Parents were more permissive with the females; half of the females claimed their parents had been permissive of their gendered behavior. Three females even claimed that their parents encouraged cross-gendered behaviors, with one emphasizing that a male identity was reinforced and crossgendered behavior encouraged. No male felt similarly encouraged toward femininity. Only two males claimed that their parents encouraged cross-gendered behaviors. In general, with some leeway for females, there was little indication that our respondents were encouraged or supported in their transsexual aspirations. Parents currently involved with a transitioning child might, in contrast with those of a previous time, be more supportive of their child’s cross-gender aspirations.

Previous investigators have considered that the relation children have with their mother or father can be influential in the development of homosexuality and transsexuality. Zucker and Bradley, for instance, have written, “[T]he influence of parental socialization on sex-dimorphic behavior, the domain for which clear parental gender socialization effects were found, is precisely the domain that encompasses many of the initial behavioral features of gender identity disorder” (Zucker & Bradley, 1995, p222). Stoller (1985, p25) wrote, “The more mother and the less father, the more femininity.” The survey did not ask responding subjects about their relations with their parents or even if they were reared in a single-parent home. However, others have studied such relationships and the findings are not consistent. Green, for instance, (R. Green, 1987) reported that boys with GID have greater emotional closeness with their mothers than with their fathers. And others such as McCord, McCord, and Thurber (1962, p361) concluded that “paternal absence is related to trends towards a feminine identification although not necessarily to overt homosexuality.” De Lange (2011) concluded that father-absent boys show a more feminine or a less masculine gender identity and report lower self-esteem than father-present boys. But according to Hetherington (1972, p313), “Few deviations in traditional measures of sex-role typing were obtained.” Hetherington interviewed, observed, and tested adolescents without fathers. She found few deviations in traditional measures of sex-role typing. In regard to transsexuality, “[n]o difference in parent-reported gender role behavior was found between father-present [and father-absent] families for either boys or girls” (Stevens, Golombok, Beveridge, & Team, 2002, p47). This was the conclusion of Stevens, Golombok, Beveridge, and Team from their study of 283 families with single mothers, 136 without any father contact. They further conclude, “The findings suggest that the gender-role behavior of preschool children develop typically despite the absence of a live-in father figure.” (Stevens et al., 2002, p47). In their review of studies regarding father-absence and transsexual development, Zucker and Bradley (1995, p243) wrote, “[For children] no simple relation could characterize the effect of father absence on gender role development. For females, virtually no effects could be attributed
While two male and three female respondents thought their parents had desired that they had been born of the opposite sex, none of the other transsexuals thought so. Buhrich and McConaghy (1978) studied the question with groups of homosexuals, transvestites and transsexuals in New Zealand. They found, as found here, that parents of most children in all groups expressed no preference that the child be of a particular sex. These investigators went on to say, “On the basis that these syndromes [homosexuality, transvestism, and transsexualism] appear to be discrete clinical categories one would therefore expect to find different patterns of parental influence in the three syndromes. This was not the case in the present study” (Buhrich & McConaghy, 1978, p107).

Sexual Orientation

While the survey specifically asked each respondent about his or her sexual orientation (SO) it did not directly ask the responding twin to indicate the SO of his or her sibling. This, however, often became apparent from responses or comments made in association with other questions. Notably, as Heylens et al. (2012) had found, we too found that of those twins concordant in transition that responded, they were also concordant in sexual orientation. One dizygotic MtF was gynecophilic before transition and remained so afterward. Commenting on his sexual experience before the transition he said, “I was very struck by how it seemed more like 2 women than male/female sex.” This study found several of our FtM respondents reporting on their fantasy arousal and sexual encounters with men indicating that it did not influence them in their decision to transition. This is in keeping with Coleman, Bockting, and Gooren (1993) who have written of such persons. Referring to the belief that female-to-male transsexuals who are sexually attracted to men are rare, they report on nine of them. “Their awareness of gender dysphoria preceded their awareness of their attraction to men. Their wish to undergo sex reassignment as a means of resolving their gender dysphoria superseded any concerns about their sexual orientation or sexual adaptation after surgery” (Coleman et al., 1993, p37).

The majority of respondents, it appears, were attracted to both men and women in both fantasy and actuality. Such a mix of heterosexual and homosexual fantasies and practices is in accordance with the fluidity in sexual orientation mentioned by Savin-Williams (2006, p116) and L. Diamond (no relation to the author) and Butterworth, (2008). Savin-Williams reported, “In one study, 100 percent of gay and lesbian adolescents acknowledged same-sex sexual attractions and fantasies, but over 80 percent of the girls and 60 percent of the boys also acknowledged heterosexual attractions, fantasies and /or arousal.” Kinsey et al. (1948, p510) wrote that “[fantasies] may be alternately heterosexual and homosexual in the case of the individual who reacts definitely in both directions.”

In regard to transsexualism among twins, and the findings reported here and by others, two questions come to mind. The first is “Why is there such a
significant difference between the MZ and DZ twins? While there was concordance for transsexuality among a third of monozygotic twins found by search and survey, concordance was essentially zero for dizygotic twins. Most obviously, the genetic constitution between monozygotic and dizygotic twins is different. So too might the environmental experiences be different. But this may also be true for monozygotic twins themselves. Singh, Murphy, and O’Reilly (2002) discuss and describe epigenetic discordance between monozygotic twins and how they may occur. They conclude that these may be more important than differences in the environment for the twins. Relations between twins has been written of previously (Koch, 1966), but recently many writings have appeared exploring “why identical twins might be different,” (e.g., Bruder et al., 2008; Fierro, 2012; Kugler, 2005; Wade, 2005).

The second question is “Why are there not more concurrent transitions among MZ twins? The majority of MZ twins, 56%, didn’t transition concurrently. The genetic complement to each of the twins in a dizygotic pair is obviously different and these differences can be significant. Even identical twins, however, are not completely identical in gene configurations. Bruder et al. (2008, p763) have reported that copy-number variation in genome biology can affect differences in behavior between MZ twins and conclude that “differences in the genetic makeup between twins derived from the same zygote represent an irrefutable example of somatic mosaicism.” And Martin, Boomsma, and Machin (1997) present a clear description of how a zygote cascades prenatally through many antenatal environmental effects and post-zygotic genetic effects sufficient to dramatically alter traits between identical twins. A new book by Segal (2012) fully discusses the genetic consideration regarding twins and the relative contributions of genetics and the environment. The book, describing twins reared apart, dramatically emphasizes the stronger role genetics plays relative to the environment. The pairs of reared-apart twins found in this study were in keeping with that finding.

Simpler considerations for our questions of nonconcordance are available. For instance, one has to consider that not all co-twins have lived their full lives, and change may yet occur. Some of the transitioning twins are not yet 30, and the mean and median age for transition we found to be older than that. For one of our twin sets that was concurrent in transition, this only could be recorded after 11 years had passed. And transitions are known to occur when individuals are in their 70s (Anonymous, 2012) or 80s (Arabiya, 2012). It has also been found in a study by M. Diamond, Watson, & Fee, in preparation), that although people might consider themselves transsexuals, for many reasons, they don’t necessarily immediately or ever follow through with an anatomical sex change. Prominent reasons for not transitioning were a real fear of losing spouse, partner, children, or employment. And particularly for females, the cost of surgery was often prohibitive; either they did not have any way to accumulate the finances needed or they feared losing their employment rendering them indigent and homeless. Many indicated that they were waiting for a parent or spouse to die or a divorce to be finalized before transitioning. In considering twins and the transsexual phenomenon, it is interesting to recognize that a
significant association was recently found between transsexualism and a genetic allele for male gender identity (Hare et al., 2009). And Lykken et al. (1993), in an extensive review, have presented evidence for the genetic heritability of many various interests among twins. We can also combine information from studies of brain components in those with GID that show a relationship to gender.

Kruijver et al. (2000) found that the bed nucleus of the stria terminalis (BSTc) of the brain of male-to-female transsexuals, regardless of sexual orientation, is structurally similar to that of females. And Zhou, Hofman, Gooren, and Swaab (1995, p68) claim their brain studies “supports the hypothesis that gender identity [of transsexuals] develops as a result of an interaction between the developing brain and sex hormones.” Chung, De Vries, and Swaab (2002) have shown that in the development of the bed nucleus of the stria terminalis this sex difference between males and females became significant only in adulthood, “showing that sexual differentiation of the human brain may extend into adulthood (page 1027).” This may be associated with late onset of GID. Japanese researchers Yokata, Kawamura and Kameya (2005, p1 of on-line publication 0-7803-6/05/$20.00 @ 2005 IEEE) have investigated shape differences in the brain’s corpus callosum (CC) in cisgendered and transgendered individuals. Their findings show significant differences in the CC shape of typical male and female brains and the corpus callosum of transsexuals. They report that the CC of transsexuals “more strongly reflects their mental sex, i.e., gender, than their physical sex.” And recently Rametti et al. reported that even before hormone treatment “female to male transsexuals (FtM) differ from females but not from males in several brain fibers (Page 1).”

Transsexuals have also been found to have auditory (Govier, Diamond, Wolowiec, & Slade, 2010) and olfactory (Berglund, Lindström, Dhejne-Helmy, & Savic, 2008) abilities that correlate with their desired gender more than their birth sex. These findings offer additional evidence to indicate that transsexualism has a biologic, nervous-system component strong enough to say that gender identity may be less a matter of choice and more a matter of biology.

Gooren (2006, p589) writes, “Obviously, male-to-female transsexuals, with a normal androgen exposure prenatally (there is no serious evidence to the contrary) develop a female gender identity, through unknown biological mechanisms apparently overriding the effects of prenatal androgens.” The evidence, I believe, is strong enough to consider transsexuality to be a form of brain intersex (M. Diamond, 2011a). This is not without challenge. Meyer-Bahlburg (2011), for instance, thinks the evidence not yet sufficient and enumerates why he thinks GID is not an intersex condition. Consider, however, the work of Hare et al. (2009, p93) that has demonstrated that, genetically, androgen-receptor-repeat-length polymorphism is associated with male-to-female transsexualism and state, “There is a likely genetic component to transsexualism, and genes involved in sex steroidogenesis are good candidates ... .”
In addition the developmental animal studies of Phoenix, Goy, Gerall, and Young (1959), Short (1979), and Goy, Bercovitch, and McBrair (1988) have more than adequately demonstrated that the behavior (brains) of mammals can be modified sufficiently to reverse their gendered/ reproductive behavior without obviously modifying their anatomy.

It is true, as Meyer-Bahlburg (2011) criticizes, that studies such as the work on humans mentioned above need replication. I agree. But, no studies have been reported that counter these reports, and my prediction is that the findings will be reproduced and transsexualism will eventually be seen as an intersex variation due to brain (nervous system) intersexuality. It should perhaps not be surprising that twins share GID as they do other personality characteristics. The similarity of twins to each other can be remarkable. One classic case reported was of a set of the so-called “Jim” twins reared apart. Although not meeting each other until late in adulthood, both had a dog named Toy, had been married twice—first to wives named Linda and second to wives named Betty; one twin named his son James Allan and the other named his son James Alan. There were other mysterious and unique commonalities (Segal, 2000).

ACKNOWLEDGMENTS

Thanks are primarily and earnestly due to the original twins that started me on this study, Aiden Key and Brenda Bowers, and all the other willing participants in this research. Thanks are also due to the clinicians and others that contributed twin sets from their own practices; particular so to Dr. Kastuki Harima of Japan. Appreciation is also extended to Rachel O’Hara and Etsuko Sakarai for their time assisting me. Many thanks are also due to Dr. Melanie S. Edel in regard to her help with the statistical evaluation.

REFERENCES


APPENDIX

Please help if you can! Are you a twin? Are you transsexual?

It is now understood that among twins, there are sets in which both have transitioned gender and other sets in which only one has switched. Will you please help us try and find out why the differences?

We are looking for twin sets, male or female, identical or fraternal, where one or both have transitioned F2M or M2F. You are needed for a research project to answer a set of questions about your background and your twin’s condition and transition. The questionnaire will ask about your development and the circumstances surrounding your and your twin’s switch. Some of the questions will be personal but most are neutral. Even if you are the twin that didn’t change and your twin the one who did, your answers would be of value. We are trying to find out those features among twins that have or have not led to gender change.

The survey will consist of a set of questions we will mail to you and your twin with a return postage-paid envelope. Answering the questions will take about one to two hours of time. Twins are welcome from outside the USA as well as within. Everything will be confidential and nothing will be identified with any particular person.

When the survey is completed the information gathered will be compiled, analyzed, and distributed to those in transsexual self-help groups and, via professional publications, to those in the helping professions. We desire to improve the lives of persons touched by the condition.

If you are willing to help, please get in touch with Dr. Milton Diamond of the University of Hawaii, School of Medicine. By mail: 1951 East-West Road, Honolulu, Hawaii 96822, USA; By email: diamond@hawaii.edu. Many, many thanks!!!!!!!!!!!!!