

Twin and Sibship Study of Overt Male Homosexuality¹

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OF the vast number of structural and functional components essential in human personality development, very few are more urgently in need of an understanding of the basic phenomena of physiological genetics than is true regarding the differentiation of sexual behavior. Irrespective of the methodological procedure used in an approach to the formation of variable behavior patterns, the sex function is certain to emerge as the axis, around which the personality is organized (2). It is not surprising, therefore, that it is the various forms of sex behavior, which have been vulnerable to rather preposterous misapplications of that ancient dichotomy perpetuated in the presumably antithetic setting of the nature-nurture controversy. The consequence has been that in many contemporary post-graduate classes, an allusion to a possible relationship between sex and organic inheritance is unlikely to provoke more than a polite smile of skepticism.

With respect to homosexuality, one of the most pretentious means of disclaiming any interaction of genetic elements in the causation of deviant behavior patterns appears to rest quite safely upon the tenet that no gene can be assumed to be capable of determining the final choice of a sex partner. As an advocate of modern principles of human genetics, one may be given an opportunity to mention that no special gene is suspected of being able to produce a potential preference for saccharine in persons predisposed to diabetes mellitus. However, the end of this kind of argument is usually reached with a repetitive denial of the existence of "any inheritable qualities in the structuralization of the sex potentiality that would direct a person either away from a member of the same sex or toward the opposite sex" (10).

From a genetic standpoint, it is rather inappropriate to separate the object from the quality of a person's sexual striving. Evidently, neither aspect can be

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expected to undergo a habitual fixation without the pre-existence of the various organic components of sexuality, which may sometimes fail to be integrated into a mature form of sex behavior. The validity of this statement remains unchanged, regardless of whether its reference is to the maturational or to the adjustive specifications of homosexual behavior patterns, and regardless of whether the term "homosexuality" is applied to the formation of all, or only to the practice of overt, sexual relations between individuals of the same sex.

Organic Basis of Sex Development. Irrespective of subsequent interferences with the integration of psychosexual maturation patterns, biologically it is quite certain that the developmental potentialities of one or the other sex are originally determined by the chromosomal organization of the gametes. The differentiation of maturational processes cannot begin, unless every cell of the developing embryo and ultimate adult has been provided with the original XX- or XY-constitution of the fertilized ovum. Gonadal hormones play an important part in activating the long process of maturation. According to Stern (22), however, they are only the tools, with which the genetic constitution of an organism directs its sexual development from a morphologically neutral embryonic stage to the functional responsiveness of adult sex adjustment.

As a rule, the balance established between the sex-controlling effect of one or two X-chromosomes and that of the other chromosomes is known to operate with a sufficient margin of safety to preclude intersexual development, that is, imperfect determination of one or the other sex due to a disturbed balance of female and male genetic tendencies. However, if a breakdown in the usual process of clearly alternative differentiation between the sexes occurs, the maturational effect of one or the other of the opposing sets of sex genes may be weakened precariously. Such an organic disarrangement is likely to lead to a variety of intersexual deviations, and thereby interferes with the full integration of ordinary patterns of sexual maturation.

Psychodynamic Versus Genetic Theories of Homosexuality. According to *psychodynamic* theories of sociological or psychoanalytical orientation, a possible causal relationship between an organically disarranged sex constitution and a tendency to overt homosexuality in the adult can be safely disregarded. A certain degree of sexual feeling toward one's own sex is assumed to remain a residual trait in every person, as the result of what is originally considered to be a complete freedom of choice. Subsequent preference for predominantly homosexual patterns is believed to be a product of individual learning and experience (4, 8, 18, 19). Final adherence to homosexual outlets in men is ascribed either to the conditioning compulsiveness of social ostracism with respect to common "physiological" deviations from the moral code of our society (10, 14) or to traumatized regression and fixation to immature levels of sexuality (1, 2, 6). In line with the latter concept, inversive anxiety may be aroused by competitiveness in the oedipal situation, and is apt to result in one

of two possible patterns of response; namely, in seductive submission to the parental rival or in erotized identification with the mother.

The apparent psychodynamic significance of a more specific type of *personality deviation* has been emphasized by a group of psychiatrically trained investigators, especially by Bychowski, Hoch, and Rado (10). In their opinion, the most common form of personality change observed in homosexual men is that of a schizoid or "schizo-sexual" disorganization, distinguished by certain schizophrenia-like obsessions and a compulsive insistence upon pregenital or paragenital gratification patterns. However, this explanation depends on the concept of "early pan-sexuality" as a possible cause of male homosexuality (in the sense of a polymorphic-perverse stage of psychosexual development) and has been entirely rejected by Kinsey and other biologists (10).

Very few contemporary investigators have shown an inclination to give cautious support to a *genetic* theory of male homosexuality as originally suggested by Krafft-Ebing (16). In the opinion of Henderson and Gillespie (7), the probability of a primary constitutional basis in some apparently conditioned types of male homosexuality is indicated not only by the frequency of physical characteristics belonging to the female sex, but also by the unusual number of homosexual men displaying special artistic ability. Familial occurrence, notably in brothers, is said by Hirschfeld (9) to have been observed in 35% of homosexual males, and some attention has been given to the hypothesis of an intersexual origin of certain forms of human homosexuality, although it had been formulated on the basis of Goldschmidt's experiments conducted with gypsy moths. The main support for the application of this theory in man has come from the observation, made by Lang (17) as well as by Jensch (11), that the sex ratio among the siblings of male homosexuals seems to deviate sharply from ordinary expectation.

However, the *statistical* adequacy of these studies has been criticized severely (5, 15). Equal validity is probably attached to Kinsey's statement that an increase in the homosexuality rates for the blood relatives of homosexuals has never been substantiated by means of statistically satisfactory investigations (14). It is evident, too, that if some homosexual men are assumed to be genetically female although phenotypically male intersexes without a Y-chromosome, their children should all be female. It would be preferable, therefore, to ascertain a significant deviation of the expected sex ratio in relation to the *offspring* rather than the siblings of homosexual males. In fact, the most conclusive test of the intersexuality theory would consist in a cytological examination of chromosomal biopsy material, which should show the lack of a Y-chromosome in intersexes with a known homosexual history (21). In the absence of such cytological data, it is fair to admit that the question of the possible significance of genetic mechanisms in the development of overt homosexuality must still be regarded as entirely *unsettled*.

Organization of the Present Study. Taking notice of this generally unsatisfactory state of information about the genetic aspects of adult homosexual behavior—methodologically long recognized as one of the thorniest topics of research—, our investigative program was planned as a concentric and strategically coordinated attack from different directions (13). The frontal approach was designed to yield comparative sex records of a statistically representative sample of predominantly or exclusively homosexual twin subjects over age 20, to be collected not only from a diversified assortment of psychiatric and correctional institutions, but also through direct contacts with the clandestine homosexual world. Other thrusts were aimed at the procurement of clinical, morphological and sociological data (a) for graduated sex ratings of both male twin index cases and single-born homosexual men as well as for those of their fathers, brothers and half-brothers and (b) for a statistically verified determination of the sex ratios among the siblings and children of both groups of index cases. However, we are ready to concede at this point that some of our original objectives remained beyond reach even within the framework of our veteran research organization.

The main reason for the given tactical setbacks may be seen in the fact that in family studies of a sexually aberrant group it is very much easier to devise scientific criteria and investigative goals than it is to attain them in actual practice, that is, in direct contacts with a series of habitually distrusting research subjects who tend to live far away from their families. As an illustration of the difficulties encountered in a study of this kind, it may be mentioned only that suitable index cases are astute in disguising their identities, personal activities and family connections. Even after having been located, they remain very poor specimens for cytological work or other laboratory examinations, simply because many of them insist upon interviews to be arranged in accordance with their habits of precaution, that is, at neutral meeting places.

Fathers and Children of the Index Cases. It is also clear that sex classifications can be made only of those children of homosexual subjects, who have been born. However, the total size of this birth-rate must be expected to be inversely related to the accuracy of the criteria applied in the search for homosexual index cases. In fact, if the present analysis is limited to two comparable samples of 85 twin subjects and 112 single-born index cases with fully recorded sex and family data and with a plainly homosexual history after adolescence, our survey provides verified evidence only of a total of 11 *marriages* contracted by homosexual men with a Kinsey rating of group 3 or higher. Most of these marriages lasted no longer than a few months, and only three of them were fertile, resulting in a total fertility quota of five *children*, three boys and two girls. Unfortunately, in no instance has it been possible to confirm the paternity of the legal fathers beyond reasonable doubt.

The data on the sex histories of the *fathers* of the index cases are equally

disappointing. In most instances, no way could be found to reach the given persons for a personal interview or to obtain adequate information about them. It may only be stated, therefore, that of a total of 88 fathers investigated, no more than two had court records, which substantiated a history of overt homosexual activities in their adult lives.

Sex Distribution in the Sibships. The sex distribution of the *siblings* of the index cases is recorded in tables 1 and 2. These data have been arranged in such a manner that the sex ratios observed in the sibships of our single-born and twin index samples of homosexuals can be compared not only with the conflicting surveys of Lang (17) and Darke (5) conducted under completely different conditions in Germany and the United States, respectively, but also with the entirely unrelated sex data obtained in New York City for the sib-

TABLE 1. SEX DISTRIBUTION IN THE SIBSHIPS OF SINGLE-BORN MALES WITH AND WITHOUT A HISTORY OF OVERT HOMOSEXUALITY IN ADULTHOOD

			NUMBER OF PERSONS			SIBSHIP SEX RATIO (RELATED TO 100 FEMALES*)		
			Index Cases	Brothers	Sisters	Males	t	χ^2
Previous Studies	German Homosexuals (Lang)	Over Age 25	499	956	745	128.3	3.92†	15.07†
		All Ages	1015	1734	1432	121.1	3.67†	13.54†
	American Prison Homosexuals (Darke)	Over Age 25	56	96	101	95.0	0.80	0.62
		All ages	100	178	168	106.0	0.04	0.00
Present Study	New York Homosexuals	Over Age 25	68	168	132	127.3	1.55	2.43
		All Ages	112	263	208	126.4	1.87	3.54
	Control Group of Institutional Employees	Over Age 25	101	161	152	105.9	0.04	0.00
		All Ages	116	185	167	110.8	0.41	0.16

* Expected Sex Ratio: 106 Males to 100 Females.

† Significant at the 1% Level of Confidence.

ships of two apparently non-homosexual control groups. One control group consists of a consecutive series of adult male twins distinguished by a history of pulmonary tuberculosis (table 2), while the other group comprises all the male employees of the Psychiatric Institute (table 1). The observed sex ratios in their sibships are 92:100 and 110:100, respectively, and are clearly within the limits of statistical expectation. According to both the t test and the chi-square, a difference as large as, or larger than, the one observed between the theoretical ratio of 106 males:100 females and the ratio 92:100 found in the sibships of tuberculous twins would actually be expected to occur by chance nearly 15 per cent of the time.

By contrast, a fairly consistent tendency to deviate toward an excess of males appears to express itself in the sibships of our single-born and twin

index samples of homosexual men. The given sibship sex ratios are 126:100 and 125:100, respectively, and seem to be in notable agreement with the ratio of 121:100 observed by Lang. However, contrary to the deviant ratio in Lang's sample, which is statistically significant at the 1 per cent level of confidence, the deviations in our numerically smaller sibship groups fail to reach statistical significance even at the 5% level of confidence and with respect to both *t* and chi-square values. Statistically speaking, a difference as large as, or larger than, the ones obtained between the theoretical ratio and the two ratios observed in our samples would be expected to occur by chance about 6% of the time (13).

In order to preclude the possibility of a few large and predominantly male sibships being responsible for the observed deviation in the sex ratio, the sibships of the single-born homosexual sample have been analyzed as to whether they do or do not share a particular excess of males. Taking into account the various sibship sizes, one would expect to find an excess of males in 47.6 of the 112 sibships studied. Actually, 51 sibships show such an excess. How-

TABLE 2. SEX DISTRIBUTION IN THE SIBSHIPS OF ADULT MALE TWINS WITH A HISTORY OF OVERT HOMOSEXUALITY OR PULMONARY TUBERCULOSIS

		NUMBER OF PERSONS			SIBSHIP SEX RATIO (RELATED TO 100 FEMALES)		
		Index Cases	Brothers	Sisters	Males	<i>t</i>	χ^2
Homosexual Twins	Over Age 25	68	85	65	130.8	1.26	1.59
	All Ages	85	104	83	125.3	1.14	1.27
Tuberculous Twins	Over Age 25	81	174	175	99.4	0.63	0.38
	All Ages	104	206	224	92.0	1.50	2.22

ever, the observed difference is smaller than the standard deviation and, therefore, may be expected by chance.

It is possible, of course, that the disproportioned sex distribution among the siblings of the two New York State samples of homosexuals is by no means accidental and discloses a lack of statistical significance only because of their limitations in size. However, no more than a suggestive trend can be assumed on the basis of the available data, and careful re-examination of this trend in more extensive samples appears necessary. Particular attention should be given in these studies to the possibility of a specific genetic mechanism modifying the control of the sex ratio, a theory advanced very recently by Bernstein (3) in order to explain the tendency of a statistically excessive number of families to produce offspring of one sex only or primarily one sex.

According to this theory, the genes controlling the sex ratio act through the endocrine system, especially the sex hormones, and may even be identical with the genes controlling the male-female sex hormone balance. It has been observed, for instance, that bald and unusually aggressive-masculine fathers

have an excess of boys, while the reverse seems to be true for the matings of fathers who are "in professions in which many famous women are engaged, i.e., actors, social workers, fiction writers, and all kinds of artists." If it is correct to assume, in view of Bernstein's findings, that X-bearing sperms (because of their female chromosomal balance) form a foreign entity in the male reproductive organs and, therefore, are destroyed in smaller or larger number inside the male (depending on the degree of maleness), it is quite obvious that the entire question as to the possible biological significance of

TABLE 3. GRADUATIONS OF OVERT HOMOSEXUALITY (KINSEY'S RATING SCALE) IN THE COTWINS OF 85 MALE HOMOSEXUALS

SEX CLAS- SIFICA- TION	TWIN INDEX CASES			ONE-EGG COTWINS						TWO-EGG COTWINS					
	Age	Zygosity		6	5	4	3	2, 1, 0	Un- clas- sified	6, 5	4, 3	2	1	0	Un- clas- sified*
		One- Egg	Two- Egg												
6	18-25	2	2	2	—	—	—	—	—	—	1	1	—	—	—
	26-35	10	8	8	1	—	—	—	1	—	—	—	2	1	5
	Over 35	8	9	6	2	—	—	—	—	—	—	—	3	4	2
5	18-25	3	3	—	1	—	1	—	1	—	—	—	—	2	1
	26-35	2	3	1	—	—	1	—	—	—	—	—	—	1	2
	Over 35	5	5	2	2	1	—	—	—	—	—	1	2	2	2
4	18-25	—	3	—	—	—	—	—	—	1	—	—	—	—	2
	26-35	2	3	—	—	2	—	—	—	—	1	—	—	1	1
	Over 35	3	3	—	1	—	2	—	—	—	—	—	—	1	2
3	18-25	2	2	—	1	—	—	—	1	—	—	—	—	1	1
	26-35	1	1	—	1	—	—	—	—	—	—	—	1	—	—
	Over 35	2	3	—	—	2	—	—	—	—	—	—	—	2	1
Total Number ...	40	45	19	9	5	4	0	3	1	2	1	7	15	19	

* Including 14 females and 5 unclassified males (deceased or otherwise unavailable).

deviant sex ratios in different samples of family units must be carefully re-examined.

Comparative Homosexuality Ratings. In any case, more conclusive than the data on the sex distribution in the sibships of the two samples of homosexual index cases are the comparative sex ratings of their *brothers and cotwins*, if they are related to the given differences in the degree of blood relationship. The sex classifications of 40 monozygotic and 45 dizygotic twin index pairs are compared in table 3, while those of the brothers and half-brothers have been omitted because of incompleteness. Generally speaking, the homosexuality rates of the brothers and dizygotic cotwins of homosexual index cases do not seem to differ significantly. In either category, about 60% of the adult males

reveal no evidence of overt homosexual experiences after the onset of adolescence.

In the dizygotic group of index pairs, concordance as to overt homosexual behavior varies from 11.5 to 42.3%, according to whether the given rates are related to the two highest homosexuality ratings (5-6) or to the total range of Kinsey's classifications (1-6). Although these concordance rates may be acceptable only as minimum figures, they are slightly higher than Kinsey's rates of 10% and 37%, respectively, for the total male population. According to Kinsey's observations in men, distinguished by their willingness to cooperate with a study of their sexual behavior, 37% of all males admit to at least some overt homosexual experience between adolescence and old age, while 10 per cent are said to be more or less exclusively homosexual for at least three years between the ages of 16 and 55. In view of the fact that relatives of our index cases were requested only to cooperate with the investigative aims of a twin study and not with those of a sex study, it seems reasonable to conclude that the tendency to overt homosexuality in adulthood is *moderately increased* in men, who are the brothers or dizygotic cotwins of predominantly or exclusively homosexual index cases.

A completely different situation is encountered in those index pairs classified as *monozygotic*. This series of 40 pairs does not include a single cotwin of an overtly homosexual person standing at least midway on the homosexuality scale, who is classifiable either as entirely heterosexual or as homosexual below group 3. The majority of one-egg pairs not only are fully *concordant* as to the overt practice and quantitative rating of their aberrant sex pattern, but they even tend to be *very similar* in both the part taken in their individual sex activities and the visible extent of feminized appearance and behavior displayed by some of them.

It also seems significant that most of our index pairs assert to have developed their sexual tendencies *independently* and often *far apart* from each other, and that all of them deny categorically any history of *mutuality* in overt sex relations. The ostensible aversion to such an incestuous relationship is expressed even by those twin subjects who admit pre-adolescent sex play with a sister. In fact, the sexual taboo between homosexual twin brothers is generally carried so far that they disclaim not only the possibility of having had the same sex partner but also that of being familiar with any intimate details of a cotwin's sex life. Apparently, the habitual secretiveness of homosexual men is maintained even by twin brothers who live together and have formed an entity in many other respects.

Biological Theory of Overt Homosexuality. In an attempt to fit the palpable results of this study into a sufficiently broad and genetically sound concept of male homosexuality, it seems advisable to view overt homosexual behavior in the adult male as an *alternative minus variant* in the integrative process of

psychosexual maturation rather than as a pathognomonically determinative expression of a codifiable entity of behavioral immaturity. Apparently, the interactions between the biological components of sexual maturation and the adjustive phenomena of personality development form such a central and inseparable interrelationship that fractional deviations in the psychosomatic integration of the sex function from its pregenital elements to genital maturity may dislocate the axis, around which the organization of the personality takes place.

On the whole, the adaptational equilibrium between the potentialities of organic sex differentiation and the consequent patterns of psychosexual behavior seems to be so labile, that the attainment of a maturational balance may be disarranged at different developmental stages and by a variety of disturbing mechanisms. The range of such a *multiple causation* of inversive tendencies apparently extends from an unbalanced effect of opposing sex genes to the equivalent of compulsive rigidity in a schizoid personality structure. From a genetic standpoint, this range would be comparable to the extent of developmental possibilities in relation to left-handedness, which as an alternative variant in the integration of handedness is in a predominantly right-handed human world what adult homosexuality is in the sexually reproductive human species. As to left-handedness, however, very few investigators claim that a genically controlled basis or a certain unilateral use of the function of the left hand is precluded by a conditioned dexterity of the right hand, while analogous assumptions with respect to homosexual behavior are bitterly contended.

The disintegrative impact of those factors, which may lead to a psychosexual incapacity—rather than an optional dislike—for true love attachments on a mature heterosexual level, clearly expresses itself in a virtually complete degree of *concordance* as to overt male homosexuality in the present sample of *one-egg* twins. It is indicated by this finding that two males, who are very similar in the basic components of their personality organization, are much more likely than dizygotic twin brothers or ordinary siblings to be alike in those specific vulnerabilities, which favor a trend toward fixation or regression to immature levels of sexuality. The infeasibility of the old theory, which associated a narcissistic preference for a homosexual object choice with a striking physical resemblance between homosexual partners, is demonstrated by a complete *lack of mutuality* in the sex histories of homosexual twin brothers.

If the observed concordance rates for dizygotic index pairs and Kinsey's homosexuality ratings for the total male population are statistically comparable, their rather close correspondence weakens the significance of some popular etiologic concepts of male homosexuality. Apart from militating against the probability of a *special genetic factor*, capable of turning the psychosexual integration of the adult male into an overt homosexual pattern, the observation of an only moderately increased *concordance rate* of overt homosexuality

in genetically dissimilar twin brothers raised together plainly diminishes the plausability of explanations, which over-stress the importance of such precipitating or perpetuating factors as social ostracism, incompetence of a particular parent, or other potentially traumatizing experiences arising from the effect of uncontrolled imperfections in the structure of modern human societies. Of course, the general conclusion that habitual predominance of a homosexual behavior pattern results from disturbing experiences only in a *limited* number of persons, by no means minimizes the psychodynamic significance of these constellational factors in potentially vulnerable individuals.

The *intersexuality* theory or, more precisely, a genetically oriented "*imbalance*" theory is still based upon statistically insufficient and cytologically unconfirmed evidence, but it has not been eliminated as a possible explanation for certain groups of male homosexuals. The principle of a disturbed balance between male and female genetic tendencies in these cases would not even be invalidated by the observation that some homosexual men may have both a Y-chromosome and children who are boys. It is conceivable that phenotypically male homosexuals, who may be the product of an intersexual imbalance, are generally the ones distinguished by *infertility*. In view of some observed but statistically still questionable deviations in the sex ratio of affected index sibships, it is even more likely that the underlying disturbance is *hormonal* in nature, in the sense of a genically controlled disarrangement in the male-female sex hormone balance, rather than the result of a chromosomal (mutational) aberration or of an incomplete process of sex-reversal.

CONCLUSIONS

In conclusion, it may be stated that a full understanding of the biological factors, which interact in the formation of overtly homosexual behavior patterns, still requires a great deal of basic research. One may be justified to add that twin studies alone will probably not suffice to accomplish this major task, although a recognition of certain limitations of the twin study method does not seem to warrant its classification as "too crude" (20). Quite the contrary, adequately selected and statistically refined combinations of twin-sibship studies (12) with cytological, biometric and endocrinological investigations in the given family units are virtually certain to play an essential part in the further advancement of our knowledge regarding the biological components of sexual maturation and the differentiation of sexual behavior patterns.

It is also quite evident that the presently available genetic evidence, especially the observation of practically complete concordance as to overt homosexuality in monozygotic male twin pairs, throws considerable doubt upon the validity of purely psychodynamic theories of predominantly or exclusively homosexual behavior patterns in adulthood and correspondingly strengthens the hypothesis of a genically determined disarrangement in the balance between

male and female maturational (hormonal) tendencies. In any case, the need of additional work in relation to the genetic aspects of homosexuality cannot possibly be questioned. The urgency of such work is undeniable as long as this aberrant type of behavior continues to be an inexhaustible source of unhappiness, discontentment, and a distorted sense of human values.

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