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Assortative Mating, or Who Marries Whom?

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The first section reviews how much and what kind of assortative mating occurs. It considers the genetic consequences of any departure from random mating, then discusses the effects of consanguinity or inbreeding on the offspring. Suffice it to say here that these effects are generally unfavorable, so that one may say that for genetic *reasons a high similarity between spouses is not favored. The next section discusses the social consequences of marital choice in terms of theories and research related to mate selection and marital adjustment. At this point, we may summarize two opposing views of what makes for a good marriage: (1) psychological similarity and (2) complementariness of needs of husband and wife. We will see that most of the evidence tends to support the first view, so we can say that for* social *reasons similarity between spouses is favored. Another topic touched on is whether marriage leads to an increase in similarity over time, or, in genetic terms, to a partial convergence of phenotypes, which could lead to an overestimation of the degree of genotypic similarity. Next, the theory is discussed that homogamy for socioeconomic status is responsible for the observed correlations between abilities and between beauty and brains. The final section summarizes some research on factors influencing the personal preferences for personality and physical type which govern the selection of potential mates.*

I want a girl
Just like the girl
That married dear old dad
(popular song of the 1920s)

INTRODUCTION

There are a number of reasons why one may want to study mate selection in man. We will here discuss the two major ones of interest to behavior genetics.

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The first reason is that such selection has specific *genetic* consequences for the offspring; the second reason is that the nature of the mate chosen helps determine marital adjustment, which affects the *social* climate in which the children are raised. (Of course, the fertility of the marriage depends on its continuation, so that this social factor itself also has genetic consequences.)

Assortative mating is the term used to describe any systematic departure from random mating or *panmixia*. Some degree of assortative mating or *homogamy* is the rule in human marriages, since most people marry individuals of roughly the same age, socioeconomic status, and religious and ethnic background. People also tend to marry persons who are somewhat more similar in personality to themselves than one would expect by chance.

A special form of assortative mating or homogamy called *consanguinity* results from marriages between related individuals. This term is reserved for humans, while the term *inbreeding* can be used with animals or humans. Consanguinity is perhaps more polite, but the literature does not make a distinction. It is possible to quantify the degree of inbreeding for any child born to parents who have some blood relationship, no matter how distant, as long as the complete pedigree that includes one or more common ancestors of the parents is known. While *outbreeding* is a term used to describe marriages between unrelated individuals, it often has the connotation that the individuals come from distinctly different breeding populations.

ASSORTATIVE MATING

In earlier times, older men frequently married young wives, partly because they were financially not able to support a family sooner, partly to replace a wife lost in childbirth. After the death of the older husband, the widow sometimes married a younger man.

In recent times, there has come to be a great similarity in *age* between spouses. Hollingshead (1950) reported a contingency coefficient of 0.76 for age, and Rele (1965) has reported that in the United States at present the mean difference in age between husbands and wives is only 2.7 years. Earlier, Lutz (1918) reported a correlation of 0.76, so there seems to have been little change in recent years in the United States.

There is also high assortative mating by *previous marital status*; i.e., persons who have not been married before tend to marry each other and divorced persons tend to marry each other (Bowerman, 1952). While this may be due in part to the previously mentioned age factor, it is also likely to be due to personality factors.

Some religions prohibit marriage to a person from another faith, and

almost all religions look with disfavor on such marriages. Even though these restrictions are weakening, there is still a high degree of assortative mating for *religion*, even among students at a metropolitan university, as shown by the findings of the study of Burgess and Wallin (1953). While the chance expectation for persons to marry someone of the same faith was 37.1%, the actual percentage was 79.4. Hollingshead (1950) reported a contingency coefficient of 0.77 for religion when studying 1848 couples in New Haven, Connecticut.

A good deal of the assortative mating taking place is of course due to the fact that young people are exposed to only a very limited sample of possible mates: the other students in their school, the young people in their neighborhoods, and at times individuals participating in the same sports or other hobbies. Military service may provide a broadening of the possibilities for a segment of the population that otherwise travels little. This limiting factor has been called *propinquity* and has two components: *geographical* and *neighborhood.* With rare exceptions, individuals have to meet in order to decide to court and marry. (In some historical instances, young women who were orphans, juvenile delinquents, or inmates of poorhouses were sent to overseas colonies as wives for the early settlers.) To meet, persons have to live, at least temporarily, in the same part of the country. It is no wonder therefore that in a study done in Ann Arbor, Michigan, the medium distance between the birthplaces of the spouses and the place where they married was found to vary only from 40 miles in 1900 to 110 in 1950 (Spuhler and Clark, 1961). In fact, for more than a third of the sample, this distance was only 10 miles. Similarly, the mean matrimonial radius (MMR) values of Brazilian spouses are surprisingly low and increased from 26 km to only 48 km during the first part of the twentieth century (Salzano and Freire-Maia, 1970).

The other component, i.e., homogamy for neighborhood, is mainly reflected in homogamy for *socioeconomic status* (SES), which determines largely the type of residential area in which young persons grow up and the type of school they attend. In regions where there is less residential segregation by social class, parents may restrict the choice of friends by their children. Related to SES is the type of school attended. There is increasing homogamy for *education* as more and more persons go to college. In fact, because students of similar ability levels are attending similar colleges, there is perhaps even more assortative mating after high school. (See also Katz and Hill, 1958, on residential propinquity and marital selection.) Hollingshead (1950) reported a value of 0.71 for the residential areas (before marriage) of his couples and a significant chi-square for education.

The next factor in homogamy is *ethnic background.* Kennedy (1944) studied intermarriage trends among Catholics of Irish, Italian, and Polish descent, Protestants of British, American, German, and Scandinavian descent, and Jews. She found the same homogamy for religion mentioned earlier, but in

Table I. Ethnic Origin of Mother and Father for 179,327 Children Born in Hawaii Between 1948 and 1958[a]

	Mother's race									
Father's race	Caucasian	Japanese	Filipino	Chinese	Hawaiian	Puerto Rican	Korean	Other	Mixed	Total
1. Caucasian	41,939	2,877	1,002	688	588	510	439	393	6,613	55,049
2. Japanese	692	45,976	182	417	101	26	218	32	1,614	49,258
3. Filipino	697	962	12,033	209	658	248	77	174	3,835	18,893
4. Chinese	344	1,002	71	6,579	71	15	146	6	1,301	9,535
5. Hawaiian	219	179	53	78	1,176	11	22	22	1,992	3,752
6. Puerto Rican	294	56	77	9	50	1,364	8	39	631	2,428
7. Korean	120	563	35	123	17	2	717	3	270	1,850
8. Other "pure" races	270	96	110	38	104	31	22	1,441	690	2,802
9. Mixed races	2,920	1,005	1,201	1,298	1,474	430	214	420	16,449	25,411
10. Unknown	1,160	1,321	910	213	609	433	96	233	4,199	9,174
Total	48,655	55,109	15,674	9,652	4,848	3,070	1,959	2,763	37,597	179,327

[a] Morton *et al.* (1967).

addition found that Catholic Irish, Italians, and Poles formed separate intermarriage groups, even though proportions marrying within their own ethnic group had decreased by 1940 to 45, 82 and 53%, respectively.

When the ethnic differences are great enough to be called *racial*, the avoidance of intermarriage becomes even more marked, because of the highly visible nature of some characteristics such as the skin color of Negroes and Indians or the facial features of Japanese and Chinese which tend to signal large cultural differences while taking on a meaning in their own right for most individuals.

We know less about racial intermarriage in various parts of the world than we would like to know. In the United States, no records are being kept of the ethnic or racial origin of persons who marry. It is said that the incidence of Negro–white intermarriage is increasing, but no hard data are available, nor is much known about intermarriage between Japanese and white or Chinese and white.

There is one important exception. In the State of Hawaii, such records are kept. There have been more interracial marriages in Hawaii than on the mainland, but nevertheless the majority of marriages have been within the same ethnic group rather than between groups. In their monograph on the effects of neonatal mortality and congenital malformations of interracial crosses in Hawaii, Morton *et al.* (1967) analyzed the birth records of 179,327 children born as a result of a variety of matings. Of these births, 11,225 were to parents of the same unmixed ethnic group. However, of the total of 179,327, a substantial number of children were due to matings in which either the mother or the father or both were of mixed descent. If we disregard these and only look at children born to parents who were of the *same* ethnic origin, the percentage of children born from assortative mating is 87.9%. Of course, some pairs of parents will have been represented with two, three, or even more children in this table. If we assume that the fertility rates of the various racial groups are equal, then we can regard the figure of 87.9% as representing the percent of parental homogamy and 12.1% as an estimate of the percentage of interracial marriages in Hawaii. Table I is condensed from Table 4 in the original monograph.

Twelve percent interracial marriages may not seem high, but if there is no substantial immigration to Hawaii and this rate remains constant, the percent of ethnic homogamy will drop below 50% in six generations.

While in the United States marriages between Negro and white were rare or even prohibited, extramarital relations were frequent. As a result, a number of mulattoes were born, so that the American Negro is of mixed descent.

There are differences between racial groups in the gene frequencies for certain blood groups. Bernstein (1931) showed that it is possible to estimate the relative porportions of genes from the original groups that went into a

hybrid group. The admixture from the larger ethnic group into the hybrid gene pool is

$$1-\frac{f_x-F_2}{f_1-F_2}$$

where f_x is the gene frequency in the hybrid group, f_1 the gene frequency in the smaller group, and F_2 that in the larger group. Glass and Li (1953) used this method with the rhesus blood group factors R° and R^1 and PTC testing to estimate the rate of gene flow from the white into the American Negro gene pool as 3.5% per generation. To do so, it was necessary to estimate how many generations ago intermixture started and to assume as a first approximation that the rate has been constant since then. They also estimated that it will take another 1669 years (or 61 generations) before differences in gene frequencies will disappear if the rate remains constant. As they pointed out, the rate may well increase the more similar the two groups become.

Recently, Reed (1969) has reviewed all studies concerning the admixture of white genes in American Negroes. He has pointed out that their African ancestors came from many parts of Africa and that gene frequency estimates obtained only from the West Coast of Central Africa are insufficient. Considering all the evidence available on white admixture, a figure of about 22% seems the best estimate, but this value depends on the gene frequencies chosen.

The same method has been used repeatedly in Brazil. Salzano and Freire-Maia (1970) have summarized these studies and conclude that the percentage of white admixture in the Negro gene pool varies in Brazil between 34 and 57%, with a higher percentage in Rio de Janeiro and São Paulo than in Pórto Alegre. The average gene flow per generation was estimated to be between 3–6%.

ASSORTATIVE MATING FOR PHYSICAL TRAITS

While assortative mating for race leads to increased resemblance in skin color and other racial characteristics, there is assortative mating for physical traits even within the white population, as Table II shows, in which a few studies have been summarized.

Table II. Studies of Assortative Mating for Physical Traits

Trait	Correlation	Investigator	No. pairs
Height	0.28	Pearson and Lee (1903)	1000
	0.31	Burgess and Wallin (1944)	989
Hair color	0.34	Harris (1912)	774
Eye color	0.26	Pearson (1906)	774

Table III. Factors in Homogamy

Age
Civil status
Religion
Residential propinquity
Geographical
Neighborhood
Socioeconomic status
Education
Ethnic background
Race
Physical factors (height, weight, hair color)
Psychological traits
Intelligence
Interests and hobbies
Attitudes and values
Personality

Before discussing psychological homogamy, let us summarize our findings so far. Table III shows the main factors in homogamy which have been studied with the census variables first (and the variables dealing with individual differences last).

The similarity between spouses in the census-type variables will by itself probably produce greater similarity in *psychological traits* than would be expected by chance, but it appears that future marriage partners prize similarity even more because the correlations between spouses are amazingly high. This has been demonstrated in many studies in which psychological variables were investigated. For reviews of earlier studies, see Crook (1937) and Richardson (1939).

The studies reviewed by Richardson were summarized in a table. Table IV is a still further condensation of her table; it shows the findings up until World War II in the area of intelligence, interests, attitudes, values, and personality. If, as is frequently asserted, assortative mating has increased some of these values, these estimates may well be too low for today.

The correlations are generally around 0.50 for intelligence, considerably lower for occupational interests but still positive, but higher again for opinions and attitudes (0.38–0.7). For the Allport Vernon Scale of Values, the correlations run from 0.23 to 0.45. Finally, the results for personality traits are still positive, except in two of the four studies of dominance, where they are -0.05 and -0.07. For the other variables, the results run from 0.00 to 0.34. Since the review by Richardson, there have been several more studies. Burgess and Wallin (1944) studied 1000 engaged couples and obtained the following correlations for eight personality traits measured with the Thurstone Neurotic

Table IV. Summary of Studies of Psychological Similarity of Husbands and Wives[a]

Variable studied	Authors	*N*	*r*
Average of five verbal intelligence tests	Willoughby (1927, 1928)	90	0.44
Average of six nonverbal tests	Willoughby (1927, 1928)	90	0.44
Army Alpha intelligence test	Jones (1928)	105	0.60
Stanford Binet intelligence test	Burks (1928)	274	0.47
Neurotic tendency (Bernreuter)	Hoffeditz (1934)	100	0.16
	Terman and Buttenwieser (1935)	126	0.11
		215	0.22
	Sward and Friedman (1935)	56	0.34
		56	0.12
	Crook (1937)	79	0.06
Neurotic tendency (Thurstone)	Schooley (1936)	80	0.30
	Willoughby (1927)	100	0.27
Introversion–extraversion (Whitman)	Schiller (1932)	46	0.02
Introversion (Bernreuter)	Terman and Buttenwieser (1935)	126	0.02
		215	0.17
Self-sufficiency (Bernreuter)	Hoffeditz (1934)	100	0.09
	Terman and Buttenwieser (1935)	126	0.07
		215	0.12
	Crook (1937)	79	0.00
Dominance (Bernreuter)	Hoffeditz (1934)	100	0.15
	Terman and Buttenwieser (1935)	126	0.24
		215	0.28
	Crook (1937)	79	−0.05
Dominance (Allport A-S)	Crook and Thomas (1934)	66	−0.07

[a] Condensed from Richardson (1939).

Inventory: autistic tendency 0.21, cycloid reaction 0.19, depression 0.18, cognitive orientation 0.17, hypersensitivity 0.15, inferiority feelings 0.12, social introversion 0.11, platform self-consciousness 0.11. They also observed homogamy for height, weight, state of health, blond or brunette complexion, and physical attractiveness. In 1949, Gray published a paper on Jungian types in married couples. He classified his couples according to the three dimensions considered most important by Jung—introversion–extraversion, thinking–feeling, and intuition–sensation—and counted the number of times a couple were complementary, that is, of different types. The results are shown in Table V.

He also calculated equations which would predict Y, the wife's score, from knowing X, the husband's score, by $Y = a + bX$. The results were, for introversion–extraversion, $Y = 61.8 - 0.206X$; for sensation–intuition, $Y = 47.1 - 0.067X$; and, for thinking–feeling, $Y = 61.9 - 0.227X$. It can be seen that b was always negative. These two findings suggest that spouses may differ in ways that lead them to complement each other. It would have been

Table V. Distribution of Couples with Varying Degrees of Complementarity for Jung's Personality Traits[a]

No. dimensions complementary	No. couples	Percentage
3	41	15
2	83	32
1	103	38
0	40	15

[a] From Gray (1949).

more informative if the correlations between actual scores of spouses rather than mere dichotomies had been used, but this was not done.

In 1958, Winch summarized some studies by himself and associates in which he also proposed that complementary needs determined in part the nature of the mate selected. To characterize these needs, he used Murray's schema of needs (Murray *et al.*, 1938) and hypothesized that correlations between spouses for the same need would be negative, but for two different needs would be positive. Using ratings by two or more judges based on interviews and responses to eight TAT cards for 25 married undergraduate students, he obtained a significant excess of correlations in the predicted directions. However, not all possible correlations were calculated, so that it is difficult to obtain a definite conclusion from a careful appraisal of his study. Ktsanes (1955) extracted four factors from the 44 ratings on each individual, which he interpreted as (I) yielding or submissive dependency, (II) hostile dominance, (III) mature nurturance, and (IV) neurotic self-depreciation. He found spouses to be complementary on II and also on III (i.e., if one is high, the other is low), while if one is high on I the other tends to be high on II and low on IV. Using a different procedure, Roos (1956) extracted six factors and found that men high on achievement-oriented independence tended to marry women high on submissiveness and neurotic self-depreciation, whereas women high on the same factor tended to marry men high on anxious succorance. Because the objectivity and absence of halo effects for the ratings are not well established, the data are only suggestive. It is important to note that negative correlations for the same trait, hypothesized by this theory, have not been reported by earlier authors.

In an interesting paper published in 1962, Kerckhoff and Davis reported some new support for the need complementarity theory and formulated a theory of successive "filtering" of possible mates. They studied 94 couples who were engaged or going steady and compared those who, after 7 months,

reported being closer than those couples who had not moved toward permanent union. They found that the former agreed more on an index of family values (Farber, 1957) and showed higher complementarity on the FIRO-B scales (Schutz, 1958). Their theory of filtering is shown diagrammatically in Fig. 1. The first two filters tend to eliminate as possible partners all individuals who are too dissimilar in social status, and other census-type characteristics, whereas only the last filter selects for a certain degree of complementariness of needs.

In a review of research on psychological patterning in marriage by Tharp (1963), four topics were covered. Early research concentrated on exploring the degree of similarity between spouses, including psychological traits. As mentioned before, results from these studies all indicated positive correlation, i.e., homogamy. In a recent study, Hill (1968) located 97 couples who in 1947 had taken the Minnesota-Multiphasic Personality Inventory (MMPI) and administered the MMPI to their first-born child if 12 years or older ($N = 28$). The husband–wife correlations are shown in Table VI as well as the results for 66 couples tested by Gottesman (1965). Of the ten father–daughter correlations, only one was significant (Hy -0.63); the father–son, mother–son, and mother–daughter correlations were all nonsignificant.

The second topic in early studies dealt with factors related to marital

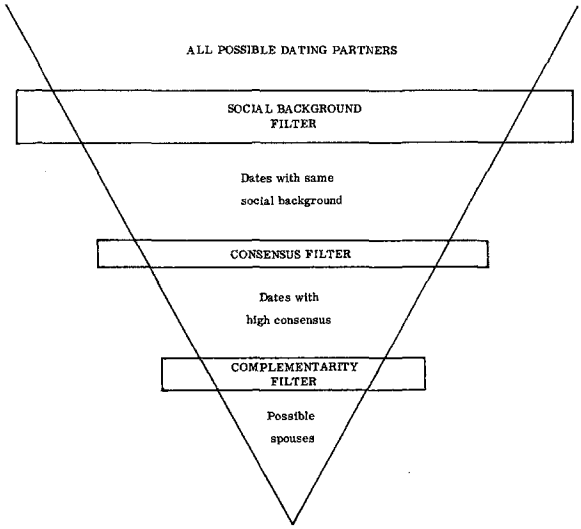

Fig. 1. Progressive narrowing-down of possible choices of mates as a result of the action of three filters (Kerckhoff and Davis, 1962).

Table VI. Intercorrelations Between Husband and Wife on the MMPI[a]

	Variable measured	97 couples (Minnesota)	66 couples (Boston)
	K Validity scale	0.09	
1	Hs Hypochondriasis	−0.02	0.26
2	D Depression	0.00	0.08
3	Hy Hysteric	−0.01	0.00
4	Pd Psychopathic deviate	0.09	0.26
5	Mf Masculinity–femininity	−0.10	−0.05
6	Pa Paranoia	0.27	−0.11
7	Pt Psychasthenia	0.25	0.06
8	Sc Schizophrenic	0.18	−0.11
9	Ma Hypomania	−0.04	−0.25
0	Si Social introversion	0.03	0.01

[a] From Hill (1968).

success. Burgess and Wallin (1953) summarized the results of their study of 1000 engaged and 666 married couples as well as studies by Terman (1938) and Terman and Oden (1947) as follows: happily married couples tend to be more emotionally stable, more considerate of others, yielding rather than dominating, more companionable, more self-confident, yet more emotionally dependent when compared to unhappily married. They found neurotic traits to be predictive of marital disharmony, a result confirmed by Burchinal *et al.* (1957). Tharp also states: "that neurotics unite in marriage with neurotics is an observation common in psychoanalytic literature."

The third topic of research on psychological patterning in marriage has been interpersonal perception, because, as phrased by Kelly (1941), "the actual relative positions of the husband and wife on a personality trait continuum are not as important in determining compatibility as the belief of the husband and wife regarding their relative positions on these scales." This relativistic position was supported by Preston *et al.* (1952), who compared 55 more happily married with 116 less happily married couples. They also found that the less happily married men "judged their wives much more severely than themselves" (Tharp, 1963, p. 99). Congruence between self-perception and perception by the spouse also emerged as a predictor of marital success. Dymond (1954) came to a similar conclusion, as did Corsini (1956) and Luckey (1960*a*,*b*). Because self-perception is determined by the role one wants to play or the model one identifies with, later research on marital happiness has used terms from theories concerning social roles and identification. The studies of Corsini and Luckey suggest that marital success depends on the congruence between the husband's self-concept and his concept of the ideal husband as well as on the congruence between the wife's perception of her

husband and her father. It turns out that there is more support for the idea that girls marry someone like their father than that boys marry someone like their mother (Tharp, 1963, pp. 101–103). Could it be that women do most of the selecting rather than men? To the extent that success in marriage depends on playing one's sex role successfully, it may help to be a good actor or a conformist.

Playing one's sex role successfully may not only make for a better marriage but also seems to lead to better mental health (Broverman *et al.*, 1970), although mental health is defined differently for women than for men.

Now that liberated women question the traditional roles, marital adjustment may require greater flexibility.

The last topic in research on marriage success reviewed by Tharp deals specifically with the theory of complementary needs. He concludes that the results of Winch's research do not provide strong support for the theory (Tharp, 1963, p. 106). Later on, Bowerman and Day (1956), Schellenberg and Bee (1960), and Katz *et al.* (1960) came to the same conclusion, using the Edwards Personal Preference Scale. Cattell and Nesselroade (1967) used the 16 PF questionnaire and compared the interspouse correlations of 102 stably married couples and 37 couples who were receiving marital counseling. Their results are shown in Table VII. Negative correlations are more charac-

Table VII. Intercorrelations of Husband and Wife on the 16 PF Scores[a]

Variable measured	102 stable marriages	37 unstable marriages	*z* of difference
A. Outgoing, warm	0.16	−0.50[b]	3.61[c]
B. Intelligence	0.31[b]	0.21	0.53
C. Emotionally stable	0.32[b]	0.05	1.44
E. Dominance	0.13	0.31	−0.94
F. Surgency, enthusiasm	0.23[d]	−0.40[d]	3.27[b]
G. Superego strength	0.33[b]	0.19	0.78
H. Venturesome, socially bold	0.23[d]	0.12	0.60
I. Tenderminded, sensitive	−0.15	−0.13	−0.09
L. Suspicious, self-opinionated	0.18	−0.33[d]	2.60[b]
M. Imaginative, bohemian	0.22[d]	−0.01	1.16
N. Shrewdness	0.18	0.27	−0.50
O. Guilt proneness	0.11	0.36[d]	−1.35
Q_1. Radicalism	0.27[b]	0.34[d]	−0.40
Q_2. Self-sufficiency	0.15	−0.32	2.41[d]
Q_3. Self-concept control	0.27[b]	−0.02	1.47
Q_4. Tense, driven, overwrought	0.16	−0.11	1.35

[a] From Cattell and Nesselroade (1967).
[b] $p < 0.01$.
[c] $p < 0.001$.
[d] $p < 0.05$.

teristic of couples with problems, while small positive ones characterize the stably married couples. They raised the question, Which is the chicken and which the egg? Does personality similarity lead to success in marriage or does continued marriage lend to similarity in personality? Longitudinal research will be needed to answer that question. In a similar study, Pickford *et al.* (1967) used the Guilford–Zimmerman Temperament Survey and also found that marital unhappiness generally was related to more extreme differences in husband–wife scores. Lipetz *et al.* (1970) compared 50 couples receiving marriage counseling with 50 couples with stable marriages. They specified 11 need pairs: male affiliation–female affiliation, male abasement–female aggression, male aggression–female abasement, male autonomy–female autonomy, male change–female change, male deference–female dominance, male dominance–female deference, male heterosexuality–female heterosexuality, male order–female order, male succorance–female nurturance, and male nurturance–female succorance. For these, they computed absolute differences between spouses and added them to obtain a total complementarity score. The smaller the difference, the greater the complementarity score. The mean and standard deviation for the stable group were 11.2 and 2.74, for the help-seeking couples 12.0 and 3.27. The difference is in the right direction, but not significant. However, on a modified version of the EEPS in which items were rewritten to apply more directly to marriage-specific needs, the difference was significant (stable couples $\bar{x} = 9.6$, SD = 2.91; help-seeking couples $\bar{x} = 13.8$, SD = 4.65, $t = 5.37$, $p < 0.001$). For seven of the 11 separate modified scales, the difference was significant. No husband–wife correlations were reported.

HOMOGAMY FOR PSYCHOPATHOLOGY

It has already been mentioned that neurotics may tend to marry each other. Kallman and Mickey (1946) estimated the expectancy of schizophrenia in spouses of schizophrenics to be 2%, or twice that in the population. Nielsen (1964) summarized other studies showing weak assortative mating and reported on a new study in which the entire population of the Danish island of Samsø was used. In 29 couples out of a total of 3280 married couples, both spouses received psychiatric care, which is 3.5 times the expected rate if referral in the same year is used to calculate the base rate, or 1.4 times if referral during the total 6-year period investigated is used. He reviews the evidence on whether spouses become more alike as the marriage continues and agrees with the conclusion of Richardson (1939) that this is not the case. He concludes that in many cases there is homogamy for traits that lead to later psychiatric referral but points out that psychiatric contact with the first spouse may facilitate referral for the second spouse.

Table VIII. Husband–Wife Correlations for Psychiatric Patients and Controls on the MPI and CMI[a]

Variable tested	22 male patients and spouses	36 female patients and spouses	79 control pairs
MPI			
Neuroticism	0.43[b]	0.47[c]	0.36[c]
Extraversion	−0.24	0.00	0.02
CMI			
Physical health	0.11	0.35[b]	0.41[c]
Mental health	0.27	0.22	0.38[c]

[a] From Kreitman (1964).
[b] $p < 0.05$.
[c] $p < 0.01$.

Kreitman (1964) administered the Maudsley Personality Inventory (MPI) and the Cornell Medical Index (CMI) to psychiatric patients and their spouses and to control pairs. He correlated the MPI scores of spouses on neuroticism and extraversion and on all physical health items (A–L) and on all mental health items (M–R) on the CMI. His results are shown in Table VIII.

As can be seen, there was assortative mating for neuroticism, even in the control pairs, and for physical health complaints in female patients and their spouses as well as in the control pairs. (Perhaps these were partly hypochondriac reactions?) Even in the controls there was assortative mating for mental health complaints.

In a later paper, Kreitman (1968) reported on married couples of which both spouses had been admitted to one of a number of mental hospitals in Southeastern England.

In 74 couples, he found 31 concordant pairs. Among the schizophrenic patients, there were four concordant pairs, 13 affected husbands, and six affected wives; for manic depressive psychosis, these figures were 16, 17, and 12; for reactive depression, 4, 4, and 12; for neurosis, 3, 7, and 3; for personality disorders and alcoholism, 4, 6, and 3; and for epilepsy, 0, 4, and 3. It is interesting to note the high concordance for manic depressive psychosis.

Kreitman also compared concordance for patients when both had been admitted first before marriage or after marriage: six out of 23 *v.* 19 out of 43. (In some pairs, one spouse was admitted before and one after marriage.)

Only for the neurotics was the concordance rate higher for the postmarital than for the premarital group, which supports the idea that neuroticism in one spouse may induce it in the other.

Levitt and Baker (1969) administered the MMPI to 25 patients of an outpatient clinic and to their spouses, and asked 11 psychologists to identify

the patient in each pair of records. The best judge was correct in 20 cases, the poorest judge in 16 cases (there was no relation to years of experience). No correlations between the scores of husband and wife were reported.

Drewery and Rae (1969) studied 22 male alcoholics and their wives and 26 control couples. They asked each person to answer the Edwards Personal Preference Scale in three ways: myself as I am; my spouse as I see him or her; myself as I think my spouse sees me. These were called A, A_1, and A_2 for the husbands and B, B_1, and B_2 for the wives. Then they calculated the following correlations: $B \times A_1$, $B_1 \times A_2$, $A \times A_2$, $A \times B_1$, $A_1 \times B_2$, $B \times B_2$, and $A \times B$. The many interesting results cannot be summarized easily. For the purpose of this review, two findings are most important: (1) The control husbands expect to be understood by their wives and are, while the patients expect to be misunderstood and predict accurately part of the nature of the misunderstanding. (2) The alcoholics are characterized by sociosexual role confusion and a dependence–independence conflict.

Although the success and happiness of a marriage depends in part on the psychological maturity of each individual, regardless of the personality of the partner, the suitability of the marriage partner chosen is the more important the greater the emphasis that is placed in that culture on the psychological satisfaction of both spouses. In the past, when the marriage only satisfied basic biological needs such as sex, hunger, and shelter, less attention was probably given to psychological compatibility. Nevertheless, even then the compatibility of the spouses would have influenced their sexual practices and hence fertility, and it may have influenced child-rearing practices. Marriages that end in separation or divorce and which therefore produce no offspring tend to be disregarded in discussions of assortative mating.

More studies are needed of differences in homogamy between successful and unsuccessful marriages in which the relative reproductive performance is considered.

One neglected consequence of assortative mating which is of interest to behavior genetics is that children from such marriages vary less within a family than could be the case if there were random mating. This is of particular importance for twin studies for two reasons. In twin-studies, the within-pair differences of fraternal twins are compared with the pair differences of identical twins. It is assumed that the environmental contribution to the within-pair differences will on the average be the same for the fraternal twins as for the identical twins but this environmental factor is influenced by the psychological makeup of the parents. If by chance there was unequal assortative mating for the parents of the two types of twins, one might expect that the diversity of environmental influences would be less for that type of twins whose parents had greater similarity. Such discrepancies probably do

occur, but how to correct for them is problematic. The general nature of parental influences on their children is not well understood, let alone the influence of differences in personality between the parents. The second and more important reason is that with high assortative mating in the parents of the fraternal twins the genetic variability of the fraternal twins is reduced over what would obtain under random mating. Of course, it should be remembered that the correlation between husbands and wives is only a correlation between phenotypes. The value of the genotypic correlation for psychological traits, if it could be measured directly, would probably most of the time be different from the phenotypic correlation because living together probably leads to some increase in similarity for some psychological traits, while dyadic relationships may develop such that one spouse becomes more dominant or more spendthrift, while the other becomes more submissive or tight-fisted.

In view of the finding that psychological similarity between husband and wife influences marital happiness, it is not surprising that cultural mechanisms have evolved which make it easier for like to meet like, including in recent times computer matching. (One cannot help wondering whether the organizations engaged in this are keeping their records and plan to do follow-up studies.) An interesting way to insure psychological like-mindedness was the Chinese custom of bringing a child-wife for a son into the household at a very early age (Wolf, 1968). This had the additional advantage that the future daughter-in-law would be properly respectful and obedient and not likely to undermine parental authority, but may have led to less sexual attraction and romantic love.

A practice less drastic but with somewhat similar results was to have one's son marry a daughter of one's brother or sister, though in small communities with little contact with the outside, cousin marriages also occur because few alternative choices exist. The above considerations as well as the wish to keep property in the family play an important role in marriages of relatives. As mentioned earlier, this type of homogamy is usually called *inbreeding*.

Perhaps especially because it was more frequent in earlier times, there may have been some awareness of its dangers. In any case, all societies studied evolved rules restricting the practice. Many of these were incorporated into religious laws. Because the Roman Catholic Church has records of dispensations issued in cases where the rule was relaxed, we know that the frequency of consanguineous marriages steadily declined as communities grew and more and better roads were built.

The fact that all human societies, whatever their kinship rules, prohibit and abhor brother–sister, mother–son, and father–daughter matings (except for god-kings) has challenged many anthropologists. Lindzey (1967) men-

tioned some of their theories in his presidential address to the American Psychological Association and showed how the facts fit a biological origin of this "taboo" and thus vindicate Freud's theories regarding the Oedipus (and Electra) complex, which stated that normal child development requires successful passage through a personal crisis in which the opposite-sex parent is desired and the same-sex parent is hated as an obstacle to this goal.

Kortmulder (1968) proposed an interesting alternative to the currently most common explanation, which he thinks is well exemplified by Claude Lévi-Strauss (1949). According to Lévi-Strauss, marriage restrictions are "mental" constructions; that is, they have a cultural origin. Even though he grants that the universality of incest taboos points toward a biological factor, he specifically excludes this possibility. Instead, he traces its origin to economic factors: redistribution of scarce goods and reciprocal gift-giving.

Kortmulder bases his theory on the finding that no sexual behavior or pair formation occurs between siblings or between parents and young in various species of birds. [In a critical note by Schwerin following the paper (p. 445) it is pointed out that we need information on this for other primates. Observations of Schaller (1963) suggest that mountain gorillas may be highly endogamous.]

Livingstone (1969) challenges the validity of theories deriving incest taboos from reduced Darwinian fitness because in the long run inbreeding would tend to eliminate deleterious genes rather than increase the death rate. He points out that mating taboos require recognition of biological family relations and some beginning of "naming" or language. It does not seem necessary to make language a necessary condition for recognition of certain individuals. Many animals are able to distinguish neighbors from strangers and will allow them to approach much closer.

When two individuals mate who have one or more common ancestors, a *coefficient of inbreeding* for their children can be calculated. The coefficient of inbreeding (F) is the value of the probability that at a particular locus the two genes will be identical "by descent," that is, from the same ancestor. This would make the genes at that locus homozygous. This value is also equal to the expected proportion of the genes that are identical by descent. (Of course, two genes from different ancestors could also be the same, but this is usually disregarded because for rare alleles this chance would be very, very small.) For a child from a brother–sister mating, the expectation is 25%, so $F = 0.25$.

The value of F can be calculated most easily by counting n, the number of individuals in each loop leading from one parent to the common ancestor and back to the other parent, not counting the offspring P, and raising 0.50 to that power. Finally, the values for the loops are added together. The choice of the value of 0.50 derives from the fact that a child receives half his genes

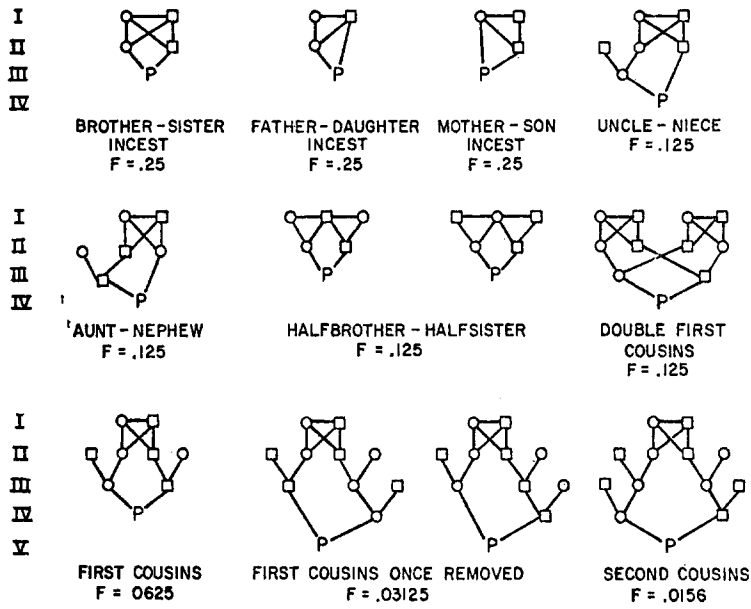

Fig. 2. Coefficient of inbreeding for P due to various types of matings.

from one parent. If the common ancestor is himself inbred with a value of F equal to F_A, the formula becomes

$$F = \sum[(\tfrac{1}{2})^n(1+F_A)]$$

as explained by Spuhler (1967).

Some diagrams and the associated values of F are shown in Fig. 2.

Crow and Felsenstein (1968) have simplified the mathematical treatment of the effects of assortative mating.

The first scientific paper in which the effect of consanguinity on intelligence was mentioned, was by Böök (1957), who found an increase in mental retardation in the offspring of cousin marriages. Slatis and Hoene (1961) reported a mean IQ of 101.5 for 87 children from consanguineous marriages and of 104.1 for 72 control children. They also reported a wider spread for the former group.

Actual mean scores on the Wechsler intelligence test were reported by Cohen *et al.* (1963). They compared 38 children from first-cousin marriages with 47 children from nonconsanguineous marriages matched for ethnic background and other relevant factors. Their results are shown in Fig. 3. Because most of the parents in their study had come to Israel from countries where Jews had lived in small isolated communities, the parents had probably lived under environmental conditions that would not favor the development

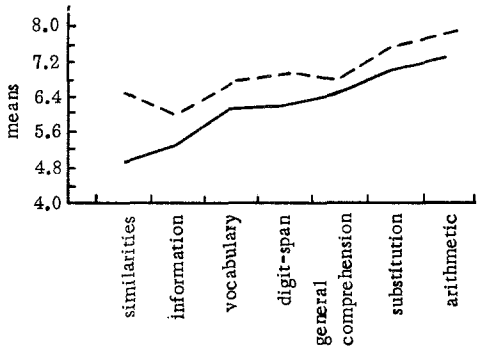

Fig. 3. Scores of 38 children of first cousins and of 47 matched controls on seven subtests of the WAIS (Cohen *et al.*, 1963). Solid line, children of cousins, broken line, controls.

of the type of mainly verbal intelligence measured by tests such as Wechsler's. To what extent this may have influenced the children from the consanguineous marriages more than those from the control group would be difficult to assess even if more data were available.

The next study to be reported avoided all such difficulties by controlling for social factors related to consanguinity which influence the intelligence of children directly, thus showing more clearly the independent effect of inbreeding. The two most important factors, which were combined into one scale, are the socioeconomic status and the education of the parents. Schull and Neel (1965) had observed a rather high frequency of cousin marriages during their study of the genetic effects of the atomic explosions in 1944 in Japan (Neel and Schull, 1956). They decided to study the effect of inbreeding as a major undertaking in itself. Thus both the unrelated parents and the consanguineous parents were from the same area around Hiroshima.

They were able to obtain Wechsler intelligence test scores on the children because this test was just being translated and adapted for Japan by Kodama and Shinagawa (1953). Besides intelligence, school achievement was studied and many physical factors such as height, weight, condition of the teeth, and general health. The effect of inbreeding was most marked for school achievement and the intelligence test scores.

Data on the Wechsler were available for 1854 children divided according to the degree of inbreeding as shown in Table IX. Because the coefficient of inbreeding forms a ratio scale, it can be directly used in statistical analyses that use a linear model. The same was true for the two other variables: social status and age of the child.

Social status was measured by a scale based on monthly amount spent

Table IX. Number of Boys and Girls Born to Unrelated Parents and Parents of Various Degrees of Consanguinity Included in Analysis of Effect of Inbreeding on Wechsler Intelligence Scores in the Study by Schull and Neel (1965)

	Parents are			
	Unrelated Parents ($F = 0.000$)	Second cousins ($F = 1/64$)	First cousins once removed ($F = 1/32$)	First cousins ($F = 1/16$)
Boys	538	88	89	249
Girls	451	100	102	237
Total	989	188	191	486

for food, the floor space per person, pets, occupation, and education of father and mother. The floor space per person is based on information on the number of tatami mats in the house. These are rather heavy woven floor coverings of a standard size (approximately 6 by 3 ft). Japanese rooms are built to fit a multiple of these mats: 2, 3, 4, up to 12. The total number is generally used to indicate the size of the house and is widely known in the neighborhood. When divided by the number of occupants, it provides a measure of the crowding or spaciousness of the home. The parental education was based on the number of years of schooling. The mean age of the child was

Table X. Effect of Inbreeding on Intelligence as Measured by a Japanese Version of the WISC ($N = 1854$)[a]

WISC subtest	Mean for outbred[b] (offspring of unrelated parents)		Depression of score due to 1% increase in F, the inbreeding coefficient	Depression as % of the mean for the outbred
	Boys	Girls		
Information	11.62	11.21	−0.09499	8.1– 8.5
Comprehension	12.39	12.12	−0.07424	6.0– 6.1
Arithmetic	11.84	12.11	−0.06025	5.0– 5.1
Similarities	11.40	11.91	−0.11575	9.7–10.2
Vocabulary	10.35	9.86	−0.11551	11.2–11.7
Picture completion	11.71	10.63	−0.06560	5.6– 6.2
Picture arrangement	11.54	11.27	−0.10728	9.3– 9.5
Block design	11.24	10.99	−0.05975	5.3– 5.4
Object assembly	10.83	9.94	−0.06298	5.8– 6.3
Coding	11.54	12.27	−0.05314	4.3– 4.6
Mazes	12.30	12.09	−0.06526	5.3– 5.4

[a] From Schull and Neel (1965).
[b] Estimated for a child of 120 months of age, a socioeconomic status of 20, and after correcting for the confounding effect of socioeconomic status.

8 years 1½ months. A multiple regression analysis was performed in which the Wechsler subtest scores were predicted from socioeconomic status (SES), the age of the child (*A*), and the coefficient of inbreeding (*F*). It was thus possible to evaluate the effect on the test scores of an increase in inbreeding by itself, i.e., after removing the effect of the other two variables. The results are shown in Table X in terms of the decrease from the mean for children from unrelated parents ("outbred children") produced by an increase of 10% in the coefficient of inbreeding. This is roughly somewhere in between being a child of double first cousins and a child of normal first cousins.

Another way of understanding these results is to compare the effect of inbreeding with the effects of a lower socioeconomic status or a younger age. Table XI shows the changes in these variables necessary to reduce the test scores by the same amount.

It is clear that the effects of inbreeding on intelligence are considerable, even when the gross effects of single gene defects are excluded.

Yet inbreeding need not always have immediate bad results. Its effect depends, of course, on the genes of the parents. If they are exceptionally free of deleterious recessives, even repeated consanguineous marriages may not lead to rapid disaster. Religious and legal rules required the Incas and Pharaohs to marry their sisters, and the offspring from such matings had a preferential right to the throne over all the other children of the ruler. It

Table XI. Same Decrease in Mean Test Scores as Seen in Children of First Cousins Would Occur by Lowering Age or SES by the Amount Indicated[a]

Wechsler subtest	Age	SES
Information	1 year 2 months	4.8 or 24.0%
Comprehension	1 year 5 months	5.6 or 28.0%
Arithmetic	11 months	4.5 or 22.5%
Similarity	1 year 9 months	5.0 or 25.0%
Vocabulary	1 year 3 months	5.3 or 26.5%
Picture completion	2 years 6 months	5.0 or 25.0%
Picture arrangement	2 years 1 month	9.5 or 47.5%
Block design	1 year 4 months	4.5 or 22.5%
Object assembly	10 years 11 months[b]	5.5 or 27.5%
Coding	1 year 1 month	4.7 or 23.5%
Mazes	4 years 3 months	15.7 or 78.5%[c]

[a] From Schull and Neel (1965).
[b] The average amount of change in 1 month is so low for this subtest that a large age difference would be required to arrive at a decrease equivalent to the drop in children of first-cousin marriages.
[c] A drop in SES lowers this subtest so little that a large SES change is needed to equate the effect of consanguinity.

Table XII. Expected Decreases in WISC Subtest Scores from the Outbred Mean for Children from Incestuous Marriages

Subtest	Expected decrease
Information	2.38
Comprehension	1.85
Arithmetic	1.50
Similarity	2.89
Vocabulary	2.89
Picture completion	1.64
Picture arrangement	2.65
Block design	1.49
Object assembly	1.57
Coding	1.33
Mazes	1.63

would be interesting to compare the number of generations during which one dynastic line ruled for Incas or Pharaohs with the lengths of dynasties in parts of the world such as Europe and Asia where such a practice did not obtain.

From the results of this study by Schull and Neel, one would also be able to predict what the effect on intelligence of the offspring would be of even closer inbreeding, namely, incest, if the effect is indeed linear over the whole range of inbreeding values. Table XII shows the predicted mean scores in the Wechsler test for children of incest. Until recently, there were no data on the intelligence of children from incestuous matings. However, in 1967 Carter published a first report in *Lancet*.

In the same year, Adams and Neel reported on a study done in Michigan. Adams, *et al.* (1967) gave more details on the 14 cases. To provide a basis for comparing the intelligence of such children, they matched the incestuous mothers with other mothers on the basis of SES, education, age, and ethnic background. All mothers were in the care of an agency, of which one function among others was to place the children for adoption or in a foster home. Because of the fear of marked retardation in children of incestuous matings, particularly careful administration of psychological tests at the University of Michigan is customary. The results for 14 cases and their matched controls are shown in Table XIII.

It is clear that the mean score is considerably lower for the children of incest than for the controls, especially if the three children who died in early infancy are included. Even when they are not, the mean is still lower, though not nearly as much. One can also see that some of such children were above normal intelligence. It should be mentioned that some of the incestuous

Table XIII. IQ Values of Children of Incestuous Matings and of Control Mothers[a]

No.	Incest	Control
1	Died after 2 months	101
2	Died after 15 hr	100
3	Died after 6 hr	104
4	Severely retarded	107
5	Severely retarded	93
6	64	100
7	64	133
8	64	109
9	85	103
10	92 (68 later)	81
11	92	108
12	98	108
13	110	91
14	112	105
15	113	91
16	114	85
17	118	121
18	119	95

[a] The mothers were matched for intelligence and socioeconomic status. From Adams *et al.* (1967).

parents came from middle-class families and included persons with college education.

There is a similar effect of consanguinity on height, birth weight, and other measures of physical development. Slatis and Hoene (1961) found a lower birth weight and higher variance in children of first cousins than in outbred children, although the difference was not statistically significant in their small sample. Furusho (1961) also found a reduction in height due to inbreeding as well as increased variance in a Japanese sample.

Ferak *et al.* (1968) found higher stature in young men and women from rural parts of Czechoslovakia whose parents had not married someone from the same village. The difference between the offspring of exogamous and endogamous marriages was only 2 inches for men and $1\frac{1}{2}$ inches for women, but the differences were statistically significant.

Schreider (1969) found a correlation of -0.32 between the average height of recruits from various districts in France and corresponding average inbreeding coefficients reported by Sutter and Goux (1962). He interpreted this as due to the fact that height has increased as a result of outbreeding: the less consanguinity in a district, the more increase in height. It is rather surprising that the correlation could be observed in spite of the fact that there

undoubtedly exist ethnic differences in height among different regions of France that would tend to obscure the correlation.

Even more surprising is the fact that there was an even larger negative correlation between the average coefficient of inbreeding and intelligence. In a study in which Raven's Progressive Matrices were used, the value was −0.48; only 25 districts were represented in this study. When data obtained by de Montmollin (1958) on recruits from all districts in France were used, the correlation actually increased to −0.52. (For clerical workers, who probably are not as likely to come from consanguineous marriages, the value was −0.31, for peasants −0.51.)

The increase in height as well as in intelligence associated with a decrease in consanguinity may be an example of hybrid vigor in man.

One wonders about the upper limit of this process. Assuredly, in some districts in France the incidence of consanguineous marriages must be approaching zero frequency. Perhaps nutritional status in various districts (which may be correlated with frequency of consanguineous marriages) contributes to the increase in height and intelligence?

Apart from the rather marked effects of consanguinity on intelligence, do we know anything about the effects of milder forms of assortative mating?

Table XIV. Correlation Between Similarity and Fertility of 183 Married Pairs[a]

Trait	Between-mate correlation	Similarity–fertility correlation	Heritability (h^2)
Weight at present marriage	0.23[b]	0.12	0.69[b]
Stature	0.29[b]	0.01	0.88[b]
Cervical height	0.26[b]	0.05	
Sitting height	0.18[c]	0.02	0.72[b]
Biacromial diameter	0.15[c]	0.01	0.31
Bi-iliac diameter	0.29[b]	0.08	0.59[b]
Forearm length	0.43[b]	0.05	0.81
Hand length	0.18[c]	−0.02	0.82[b]
Middle finger length	0.61[b]	0.07	0.88[b]
Hand breadth	0.18[c]	−0.08	0.80[b]
Minimum waist circumference	0.38[b]	0.09	0.25
Minimum neck circumference	0.20[b]	0.01	0.67[b]
Maximum hip circumference	0.22[b]	0.09	0.63[b]
Maximum midarm circumference	0.29[b]	0.04	0.62[b]
Maximum forearm circumference	0.22[b]	0.04	0.53[b]
Minimum wrist circumference	0.55[b]	0.18[c]	0.65[b]
Interpupillary breadth	0.20[b]	0.09	0.70[b]
Head height	0.18[c]	0.01	0.69[b]
Ear length	0.41[b]	0.09	0.75[b]

[a] From Spuhler (1962).
[b] Significant at the 1% level.
[c] Significant at the 5% level.

Kiser (1968) studied the effect on fertility of assortative mating for education by comparing observed fertility levels against those expected for random mating. He concluded that for whites assortative mating led to modest increases of fertility at most educational levels but modest decreases for nonwhites at most levels. For both whites and nonwhites, assortative mating increased the fertility of the lowest educational group the most.

Clark and Spuhler (1959) reported between-mate correlations and the correlation between the fertility of each couple and their similarity on a number of anthropometric variables. The results are shown in Table XIV. Also included are the h^2 values reported by Clark (1956), where h^2 is Holzinger's index of heritability.

As can be seen for the 25 anthropometric variables which showed significant assortative mating, only one had a correlation significant at the 0.05 probability level between mate similarity and fertility. The author concluded that even though assortative mating is changing the distribution of genes controlling body sizes and shapes, this will not have important evolutionary consequences since there is no relation to fertility. In 1967, Spuhler reported that there was also significant assortative mating for two intelligence tests: 0.399 for Raven's Progressive Matrices (total right) and 0.305 for total right (or 0.732 for proportion right) for the verbal part of Thurstone's Primary Mental Abilities Test. Positive correlations were obtained between the mothers' fertility and their intelligence (Progressive Matrices 0.148, PMA 0.128 or 0.234), but they were not significant for the fathers (0.032, 0.010 or 0.038).

The relative weights given by different individuals to various personality factors and physical attractiveness have been repeatedly studied by questionnaire methods in college students. Hudson and Henze (1969) replicated studies reported in 1939 and 1956 and found little change from the values expressed earlier.

While women give more weight to the psychological and social characteristics of a potential mate and a relatively low weight to physical appearance, men attribute somewhat more weight to beauty. Nevertheless, there are interesting differences among men in what they regard as important characteristics of womanly beauty.

Physical attractiveness has not been studied in any detail. Iliffe (1960) asked newspaper readers to rank 12 photographs of faces of young women in order of preference. He found high agreement between men and women, between age groups, between readers from six regions in England, and between five occupational groups. Within the oldest age group (over 55 years) there was the least agreement.

Wiggins *et al.* (1968) obtained male ratings of female silhouettes that differed in the size and shape of breasts, buttocks, and legs. They found that men who expressed a preference for large breasts could be characterized as

similar to the "image" of the *Playboy* reader. Those who preferred large buttocks tended to resemble Freud's "anal" character: neat, orderly, dependent, self-abasing, with an interesting percentage of business majors. A preference for large legs was associated with social inhibition, while preferring small legs went with social participation. Large (i.e., thick) legs would tend to suggest a shorter, stockier female, while small (i.e., thin) legs would suggest height. Perhaps more socially involved individuals prefer relatively taller girls. One need not take these striking results too seriously, but they do indicate that choices of dates and eventually of mates may be governed by a different combination of values for various individuals (Wiggins *et al.*, 1969).

To what extent such expressed preferences are predictive of actual choice and the size and correlates of individual differences have perhaps not been studied enough.

It would be of interest to compare the weights given to physical attractiveness and personality factors by individuals who have had relatively limited or more extensive sexual experience, just as it would be interesting to correlate the individual's own personality with the amount of sexual experience. Eysenck (1970) has analyzed the responses of male and female students to a questionnaire about sexual behavior and found that three factors accounted for most of the variance. He labeled them "petting," "intercourse," and "perversions." Items characterizing the first factor did not show a significant relation to personality. However, the other two did. Both males and females scoring higher on Extraversion also reported more sexual experience, with the results for males more clear than for females. Finally, there were negative correlations between sexual experience and Neuroticism, especially for men, less consistently for women. The correlations are generally low and account for only a small fraction of the variance, but many are statistically significant.

Such preferences for different physical or personality types may have no long range influence on the population frequencies of genes controlling physical proportions or personality, but they may lead to the formation of social class differences. Even this would require a stability of preferences that may not have existed because different historical periods seem to have favored different types of female beauty, if the testimony of painters and sculptors can be taken as representative. This changing ideal may have prevented the occurrence of too long an emphasis on one extreme and made for maintenance of a certain balance. Nevertheless, there may have been in some parts of the world selective tendencies which were maintained long enough to produce distinct differences. Many American visitors to Mexico and Spain have been struck by a more pronounced sexual dimorphism than they are accustomed to at home. A majority of women are short, rather heavy, and sturdy, while many men are slender and taller, almost as if they belonged to another race. One is reminded of the prehistoric Venus of Wilmerstadt.

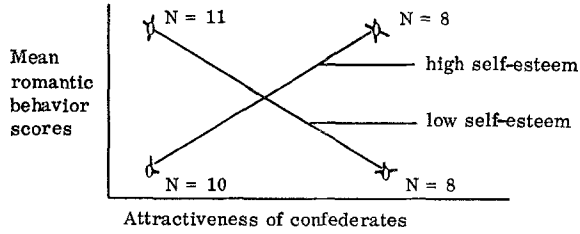

Fig. 4. Relation between "romantic" behavior by males and attractiveness of female as a function of the males' self-esteem.

Similar factors may have encouraged the submissiveness of women in some cultures.

To the extent that body types are correlated with psychological traits (via differences in hormonal balance, perhaps), it is possible that different biological types are represented in different proportions in various social classes. It is not unlikely that there are human counterparts of Arabian race horses and Belgian work horses, with their differences in temperament as well as in physique.

Part of the differences in factors emphasized in mate selection can be traced back to the male's appraisal of himself as he believes he is valued by others. This was shown by Kiesler and Baral (1970). They obtained the results shown in Fig. 4 in a study of the relation between what they called "romantic" behavior by male subjects and the physical attractiveness of females (who were confederates of the experimenters). The relationship was positive for males with high self-esteem and negative for males with low self-esteem; i.e., the former engaged in more attempts to contact a female the more attractive she was, while the reverse was true for the latter. If this factor is operating on a large scale and if physical beauty is in part controlled by genes, one would expect a greater frequency of physically attractive wives in higher socio-economic groups. In that case, we would eventually expect an association of beauty and brains.

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