Surname Repetition and Isonymy in Northeastern Hungarian Marriages

T. KOERTVELYESSY,[1] M.H. CRAWFORD,[2] M. PAP,[3,4] AND K. SZILAGYI[4]

Abstract The repeated-pair (RP) approach to surnames in married couples is a measure of population subdivision resulting from the influence of lineagelike behavior in mate choice. An excess of RP over random RP implies limitations in mate choice and a reduction of genetic variability. Here we apply the RP method to data from the rural populations of Csaroda, Tiszaadony, and Tiszavid in northeastern Hungary. The results indicate small differences between RP and random RP for Tiszavid and somewhat larger differences for Tiszaadony and Csaroda. The excess of RP over random RP in Tiszavid, however, derives primarily from marriages simultaneously isonymous and repeating in only one lineage. The discrepancy between RP and random RP implies a small reduction in genetic variability.

Human population structure can be analyzed from diverse data sets, such as gene frequencies, anthropometric measurements, migration and marital movement, pedigrees, and surname distribution (Crow and Mange 1965; Lasker 1985; Leslie 1985). Inbreeding has been estimated by the method of Crow and Mange (1965) from the incidence of isonymous marriages for a number of populations in the past. However, because of the low incidence of isonymy in many populations, this method may involve high sampling errors. To overcome this problem, matrix methods for the analysis of mating structures from the information available on all marriages (isonymous and nonisonymous) in a given population have re-

[1] Department of Anthropology, Ohio University, Athens, OH 45701.

[2] Department of Anthropology and Laboratory of Biological Anthropology, University of Kansas, Lawrence, KS 66045.

[3] Teacher Training College, H–4026 Debrecen, Hungary.

[4] Department of Evolutionary Zoology and Human Biology, Kossuth University, H–4010 Debrecen, Hungary.

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cently been introduced by Devor (1983), Lasker and Kaplan (1985), and Pinto-Cisternas et al. (1985).

The repeated-pair (RP) approach (Lasker and Kaplan 1985) uses information on the repetition of the same two names in marriages. Because surnames mark lineages, RP values indicate population subdivision resulting from the influence of lineagelike behavior on mate choice. This method has been applied to data from a number of populations (Lasker and Kaplan 1985; Lasker et al. 1986; Pollitzer et al. 1988; Koertvelyessy et al. 1989). A modification of the RP approach, designated as RP_w (Lasker 1988), has been designed specifically for the analysis of marriages into British one-surname lineages. In addition, the relationship between repeating marriages (RP) and absolute heterozygosity (D) has been explored in a subdivided island population (Koertvelyessy et al. 1988). In this article we estimate the degree of population subdivision from the influence of lineagelike structure on mate choice in agricultural populations in the Tiszahat region of northeastern Hungary and provide an example of heterogeneity in regard to mating behavior within a small geographic region and in presumably economically homogeneous populations.

Materials and Methods

Biosocial Background. The villages of Tiszaadony, Tiszavid, and Csaroda (Figure 1) are located in the Tiszahat part of Bereg county in northeastern Hungary (the area between the river Tisza and the USSR border). The Tiszahat region today is an area of roughly 600 km^2, about 40 km long and 20 km wide, and consists of some 20 villages with population sizes of 500–2000 individuals per village (Szilagyi 1978).

Seminomadic Hungarians, consisting of a confederation of seven Ugrian-speaking mounted tribes, occupied the sparsely populated Carpathian basin around A.D. 895 (Dienes 1972; Macartney 1962). Although state formation (based on Western Christianity, continued animal husbandry, and increasingly more agriculture) accelerated the transformation of the great majority of the people into land-cultivating peasants in A.D. 1000, the formation of towns in the Western sense occurred mostly only after the Mongolian invasion in 1242 (Fel and Hofer 1969; Sinor 1959). Archival references date the villages of the Tiszahat region mainly to the second half of the thirteenth century and the first part of the fourteenth century, but some of these villages appear as early as 1214. Tiszaadony, Tiszavid, and Csaroda first appear in 1290, 1298, and 1299, respectively, in these records (Mezo and Nemeth 1978).

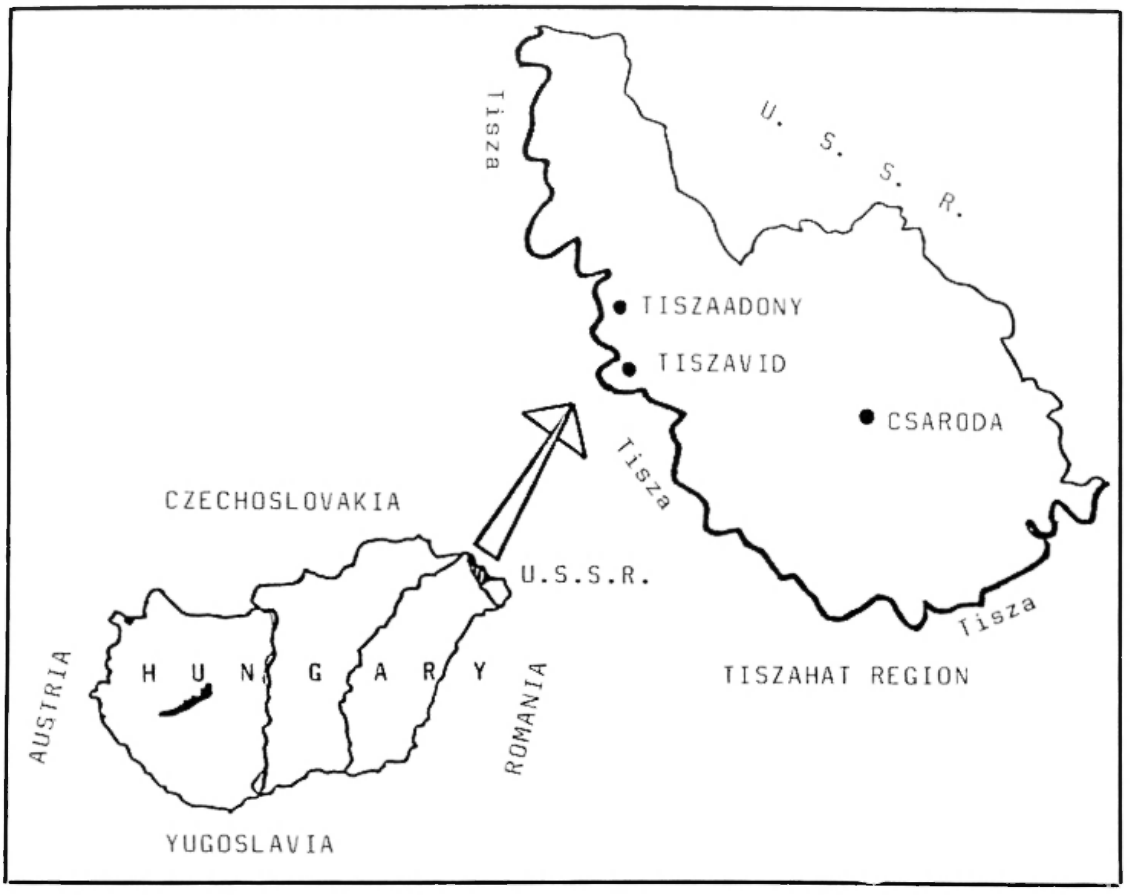

Figure 1. Location of the villages of Csaroda, Tiszaadony, and Tiszavid in the Tiszahat region of northeastern Hungary.

The Tiszahat region at present is mainly agricultural, producing wheat, barley, corn, sugar beet, sunflower, fruits, and vegetables. In addition, animal husbandry is important, with swine, cattle, sheep, horses, and fowl being raised. Industrial development occurred only after 1945 and particularly in the late 1960s, but as late as the 1970s only 2500 individuals were employed in industrial enterprises (Szilagyi 1978). Before 1945 most of the land in the Tiszahat region belonged to large estates, with the majority of the people engaged in wage-labor and sharecropping for these holdings; others owned a few acres of their own land and were small-holder peasants (Barkoczi 1978; Fazekas 1978). The social life and the customs of one of the Tiszahat villages (Beregdaroc) at the turn of the century have been treated by Papp (1975), and Babus (1957, 1976) has described various aspects of Lonya. In addition, many details of the classic study of Hungarian peasant culture (Fel and Hofer 1969) are also applicable to the villages of the Tiszahat region.

Data. Information on isonymous and repeating marriages were obtained for the populations of Tiszaadony, Tiszavid, and Csaroda from ecclesiastic records during fieldwork in 1986 and 1987. These records date from 1840 for Tiszaadony, 1764 for Tiszavid, and 1781 for Csaroda. A total of 2183 first marriages were consulted for the purposes of this investigation. Of these, 580 are from Tiszaadony, 591 from Tiszavid, and 1012 from Csaroda. The ratio of community exogamous to community endogamous marriages, based on residence at time of marriage, is 0.89, 1.01, and 0.71, respectively, in the three villages.

Methods. Lasker and Kaplan (1985) estimate the extent of marriage between lineages (as these are marked by surnames) by

$$\mathrm{RP} = \sum [S_{ij}(S_{ij} - 1)]/[N(N - 1)], \tag{1}$$

where S_{ij} is the number of marriages with a husband of the ith surname and a wife with the jth surname and $N = \sum S_{ij}$.

Population division resulting from preferential interlineagelike mating practices is depicted by the excess of observed RP from its random expectation. Chakraborty (1985) gives the random component of RP as

$$\mathrm{RP}_r = \left\{\left[\sum S_i^2/N(N-1)\right] - [1/N-1]\right\}\left\{\left[\sum S_j^2/N(N-1)\right] - [1/(N-1)]\right\}, \tag{2}$$

where S_i is the number of husbands with the ith surname in the sample, S_j is the number of wives with the jth surname, and

$$\sum_i S_i = \sum_j S_j = N.$$

Results

Table 1 provides the raw data (sample size, number of unique pairs of matings, and number of nonunique pairs of matings) and the measures derived from these data [number of repetitions; proportion of repetitions; random RP; difference between observed RP and random RP, both as an absolute amount (i.e., $\mathrm{RP} - \mathrm{RP}_r$) and as a percentage of random RP; and RP_r as a percentage of RP] for the three populations under consideration. The highest values for both RP and RP_r are observed in the

Table 1. **Repeated Marital Pairs and Random Expectations for Repetition in Matings for the Tiszahat Region Populations of Tiszaadony, Tiszavid, and Csaroda**

Measure	*Tiszaadony*	*Tiszavid*	*Csaroda*
Number of couples	580	591	1012
Number of unique pairs of names	471	467	772
Number of nonunique pairs of names	109	124	240
Number of repetitions $[\Sigma[S_{ij}(S_{ij}-1)]]$	166	362	482
Proportion of repetitions $[RP = \Sigma[S_{ij}(S_{ij}-1)]/N(N-1)]$	4.94×10^{-4}	10.38×10^{-4}	4.71×10^{-4}
Random RP (RP_r)[a]	3.71×10^{-4}	9.52×10^{-4}	3.27×10^{-4}
$RP - RP_r$	1.23×10^{-4}	0.86×10^{-4}	1.44×10^{-4}
$(RP - RP_r)/RP_r$ (%)	33.15	9.03	44.02
RP_r/RP (%)	75.10	91.78	69.43

a. Calculated by the analytic method of Chakraborty (1985).

Tiszavid population. Although Tiszaadony and Csaroda are somewhat comparable for RP and RP_r, the values obtained for Csaroda on these measures are lower than those for Tiszaadony. The quantity ($RP - RP_r$) is highest for the village of Csaroda and lowest for Tiszavid.

Because the repeated pair approach considers the information from all matings, RP values reflect the incidence of isonymous and nonisonymous matings in a given population. It is possible, therefore, that the results obtained for these Tiszahat region populations are confounded by isonymy-related differences among them. For this reason coefficients of inbreeding by isonymy were calculated according to the method of Crow and Mange (1965) for each village. The obtained values (Table 2) indicate that small differences exist between the three populations and suggest that inbreeding is not an important factor in any of the villages. As a matter of fact, the results for the Csaroda population indicate the avoidance of isonymous matings. The incidence of isonymy (P), however, is highest in the Tiszavid population.

Although inbreeding in this case is highly unlikely, it is possible that matings that are both isonymous and repeating contribute differentially to the RP scores in the three populations. Consequently, we expunged all isonymous matings from the data and recalculated the RP values for each of the populations. The recalculated RP values are presented in Table 3. These values indicate a small decrease in Tiszaadony for RP, RP_r, and the quantity ($RP - RP_r$) after the exclusion of isonymy. In Csaroda RP remains almost identical, RP_r decreases slightly, and ($RP - RP_r$) increases slightly because of exclusion. In the Tiszavid

Table 2. **Coefficients of Isonymy (F) for the Tiszahat Region Villages of Tiszaadony, Tiszavid, and Csaroda**

Population	*Isonymy (P)*[a]	F[b]	F_r[c]	F_n[d]
Tiszaadony	0.0258	0.0064	0.0044	0.0021
Tiszavid	0.0355	0.0089	0.0079	0.0011
Csaroda	0.0158	0.0039	0.0045	−0.0006

a. P = isonymy/N.
b. $F = F_n + (1 - F_n)F_r$.
c. $F_r = \Sigma p_i q_i/4$.
d. $F_n = (P - \Sigma p_i q_i)/4(1 - \Sigma p_i q_i)$.

Table 3. **Repeated Pairs and Random Expectations for Repetition in Matings with Isonymous Data Expunged for the Tiszahat Region Populations of Tiszaadony, Tiszavid, and Csaroda**

Measure	*Tiszaadony*	*Tiszavid*	*Csaroda*
Number of couples	565	570	996
Number of unique pairs of names	467	463	767
Number of nonunique pairs of names	98	107	229
Number of repetitions $[\Sigma[S_{ij}(S_{ij}-1)]]$	144	174	468
Proportion of repetitions $[RP = \Sigma[S_i(S_{ij}-1)]/N(N-1)]$	4.52×10^{-4}	5.36×10^{-4}	4.72×10^{-4}
Random RP (RP_r)[a]	3.32×10^{-4}	6.85×10^{-4}	3.11×10^{-4}
$RP - RP_r$	1.20×10^{-4}	-1.49×10^{-4}	1.61×10^{-4}
$(RP - RP_r)/RP_r$ (%)	26.55	−21.75	51.77
RP_r/RP (%)	73.45	127.80	65.89

a. Calculated by the analytic method of Chakraborty (1985).

population, on the other hand, the exclusion of isonymous data results in a substantial change. RP in this case is reduced by nearly one-half, RP_r is reduced by almost one-third, and the value for random RP exceeds observed RP, yielding a negative value for the quantity ($RP - RP_r$). In the Tiszavid population, then, the initially observed RP values derive from the occurrence of matings that are simultaneously isonymous and repeating.

Discussion and Conclusions

The significance of the scores obtained from the repeated-pair approach to surnames in marriages is discussed elsewhere in more detail [see Lasker and Kaplan (1985) and Mascie-Taylor et al. (1987)]. However,

this measure is not a simple function of inbreeding. Rather, RP scores can derive from marriage between close kin, population subdivision and the Wahlund effect, preferred marriages in some cultures (labeled as levirate and sororate), or marriages in which two brothers marry two sisters. Briefly, any excess of RP over RP_r indicates the extent of involvement of lineages, as these are identifiable by surname markers, in mate selection. Such preferential mating arrangements could derive from several situations: avoidance of close inbreeding, marriage alliance between lineages or families for economic or political purposes, or possibly simple cultural preferences. Whatever the underlying cause for such preferential mating arrangements, a tendency to repeat the same pairs of surnames in a population will cause an increase in the number of entries in some cells and a simultaneous decrease in the number of entries in other cells of the matrix of husbands' surnames by wives' maiden names relative to the expectation of surname combinations under the assumption of random mating. It should be emphasized, however, that the repeated-pair approach does not identify the cause(s) of these preferential mating arrangements.

The values obtained to date for RP, RP_r, and the difference between these ($RP - RP_r$) are quite variable from one population to the next. The largest score for RP ever reported is for the French-speaking population of St. Barts Island (James et al. 1986). Other relatively high values describe the Fylingdales Parish population (Pollitzer et al. 1988), the Fogo Island, Newfoundland, Catholics (Koertvelyessy et al. 1988), the resident population of Sanday in the Orkney Islands (Mascie-Taylor et al. 1987), and the village of Jand in northeastern Hungary (Koertvelyessy et al. 1990). The RP scores obtained in the present study for the populations of Tiszaadony and Csaroda represent mid-level values only. The Tiszavid RP value, on the other hand, is quite high; it is exceeded only by the St. Barts, Fylingdales, and Fogo Catholic RP scores.

A comparison of the values obtained for random RP is somewhat more difficult than the case for RP because in some instances [e.g., Pollitzer et al. (1988)] RP_r scores are not reported. Nevertheless, the highest RP_r score ever reported is for St. Barts, followed by the values for the Sanday residents and the present Tiszavid population. For Tiszaadony and Csaroda the RP_r scores are among those in the relatively lower range of values so far reported.

Because an excess of RP over RP_r indicates preferential interlineage marriage arrangements in a given population, perhaps the most interesting aspect of the RP statistic is the difference between RP and RP_r. To date, the highest values for the quantity ($RP - RP_r$) have been found in Fogo Island, especially in the Catholic and Anglican subdivisions

(Koertvelyessy et al. 1988). In this study the largest discrepancy between RP and RP_r is in the Csaroda population and the smallest in the Tiszavid population (144×10^{-6} versus 86×10^{-6}). Although the Csaroda results are relatively high, they are less than the values reported for several other populations (e.g., Fogo and all its religious subdivisions, Sanday nonresidents, and St. Barts). Similarly the ($RP - RP_r$) score obtained for Tiszaadony (123×10^{-6}) is relatively large, and even the Tiszavid score is well ahead of the scores reported for Vamosatya (Koertvelyessy et al. 1990), Paracho (Lasker and Kaplan 1985), and Reading and vicinity (Lasker et al. 1986).

The reanalysis of these data following the exclusion of isonymous matings yields interesting results. In Tiszaadony there are small decreases in RP, RP_r, and the difference between these scores. In Csaroda RP remains similar, whereas RP_r decreases and ($RP - RP_r$) increases slightly. In the Tiszavid population, however, the exclusion of isonymous matings results in a substantial decrease in RP, RP_r, and their difference. In fact, the quantity ($RP - RP_r$) becomes negative for Tiszavid. This is similar to the situation in Jand, where expunging the isonymous material resulted in a substantial change and a negative value for ($RP - RP_r$).

In Tiszavid, however, the magnitude of the change and the magnitude of the negative score for ($RP - RP_r$) are greater than the same magnitudes in Jand. Tiszavid is similar to Jand in another way. In Jand the initially obtained RP value derives from the occurrence of matings that are both isonymous and repeating, primarily observable in one lineage that is the most common name in that village. In addition, isonymous and repeating matings in the second most numerous lineage in this village also contribute to the RP score, but only slightly. In Tiszavid the largest and third largest lineages involve matings that are isonymous as well as repeating. Here again the contribution of the largest lineage to RP is relatively large, nearly 50% of the total, whereas that of the third largest lineage is relatively small.

In the populations of Tiszaadony and Csaroda an entirely different situation obtains. Here the leading lineages contribute little, if anything, to either the RP score or RP and isonymy simultaneously. Thus in these populations a larger number of lineages contributes a small amount to the observed RP values, rather than a few lineages monopolizing the repeating types of matings. Although it is interesting to observe such differences in mating behavior within a relatively small geographic region and in presumably economically and culturally homogeneous populations, it is impossible at present to account for these differences. Ultimately, perhaps, the observed differences derive from subtle cultural, demographic, or historical factors characterizing the populations in question.

RP scores have genetic consequences. Repetition of the same sets of surnames in married couples, like the repetition of the same sets of rare alleles, implies limitations in mate choice and a small reduction in genetic variability resulting from the division of the population into endogamous subgroups (Lasker and Kaplan 1985; Lasker et al. 1986). Because this suggestion was tested and confirmed in the religious subdivisions of Fogo Island (Koertvelyessy et al. 1988), we can reasonably expect a small reduction in the genetic variability of Tiszavid and somewhat larger reductions in Tiszaadony and Csaroda.

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