

How the methods of natural sciences can help in the studies of ethnically mixed families?

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Statistical physics is the branch that uses different mathematical methods in solving not only physical problems. The field of application may be the interdisciplinary studies of many social phenomena. The reason is that they have a stochastic nature. The aim of the paper is to display the opportunities of using the methods of natural sciences in the social sciences. The example is suggested of the joint research in demography, sociology, statistics, and ethnography of ethnically mixed families. These are the marital couples where a husband and a wife consider themselves as belonging to different ethnicities. It was demonstrated that application of the reasons used in the kinetic theory helps us to introduce new measure that describes mutual attitudes for a specific combination of ethnicities. The idea of this measure calculation is quite simple. We simply relate the number of marriages established from the reasons of full randomness of collisions of “particles” (persons) and their connection irrespective to their type, and the phenomenology – the actual number of families for a given combination of husband’s and wife’s ethnicity observed from the population censuses. What we mean by “collision” is any form of personal or social interaction (meeting, conversation, participation in small groups at work, family, schooling, tourism, journey, sports, etc.). This measure may be called inter-ethnic propensity, or its inverse value as an inter-ethnic distance. One more new measure is used to describe a propensity to form ethnically mixed marriage with a spouse of any different ethnicity. Numerically it is calculated as a share of ethnically mixed families of a given ethnicity among all the families of this ethnicity. Similar to chemistry, it may be called “valency”.

It was shown that in such multiethnic country like Russia both measures cannot be estimated as the good and adequate ones. The reason is a significant inhomogeneity of ethnicity distribution by territory of the country. Some of such peoples have their own national republics, some do not have such administrative-territorial organization but reside in a few number of regions. However this does not mean that the measures introduced are the wrong ones. Simply before their calculation we require to perform co-called “geographical” decomposition that explicitly takes into account the fact and the extent of territorial distribution of population of all the ethnicities in this country by regions. In terms of kinetic approach for gases it may have the analogy of various density of different particles by the volume they are placed in, that is required at consideration of their physical properties.

The paper also aims to display that using of methods from natural sciences lets us produce much more clear explanation, more simple understanding, modeling, interpretation of the processes under consideration.

Description of the models and measures mentioned, the results of the approach suggested were published in the new electronic journal Demographic Review (Demograficheskoe obozrenie, in Russian) and presented at the international conferences at the HRU Higher School of Economics and Moscow State University.

As a new problem statement in ethnography not solved yet an analogy with thermodynamics is suggested for analysis of ethnical population structure and its evolution. Some questions in this field are: Is the entropy actually growing over time as applied to the composition of population by ethnicities? May the dynamics of the population of the USA considered as the well-known “melting pot” for ethnicities be interpreted in the way similar to the second law of thermodynamics? Why this law is not valid in the general case for population ethnic structure at the level of city or country?