Structural Rifts and Personal Network — Social Science Applications of Negative Binomial Models

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With the application of the "size generator" survey method and the negative binomial regression model it is possible to analyze the structural rifts around society's certain subgroups, and identify the factors that may cause them. Also, using the overdispersion parameter of the negative binomial regression as an indicator of the depth of these rifts, subgroups of society can be compared according to their isolation in personal — acquaintanceship and trust — networks.

The main problem with this method is that there seems to be a negative relationship between the overdispersion parameter and the size of the examined subpopulation. The main goal of my thesis was to somehow correct for the effect of group size, by simulating and sampling several two-group (in-group and out-group) networks and by analyzing the correspondence between the overdispersion parameter and the network parameters.

This work has shown that indeed, [1] there is a negative (exponential) relationship between the size of the examined subgroup (p) and the overdispersion parameter of the negative binomial regression model (α). Also, it has shown that [2] the parameter α is positively correlated with the network homophily (η), and [3] not considerably correlated with the average degree in the two-group networks (λ). In addition, using the results of a multiple regression model of alpha and the network parameters we estimated network homophily. Although the estimation had poor accuracy on a real-life phone call network, it was less sensitive to group size effect than the overdispersion parameter, thus it is more suitable as a measurement of the depth of structural rifts.