

# *Study of Political Preferences and Type 1 Errors in Traditional Correlation Approach*

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**Abstract**—The article illustrates the problem of frequent absence of linear correlations in case of simultaneous simplest non-linear relations using the example of study of political preferences of young people that leads to system errors. The specific results are provided here to demonstrate type 1 errors when linear correlation shows the results close to zero. Such relations are simply not considered (even by supporters of “significant” correlations), but in fact there is often a real strong simple non-linear relation that completely changes the picture of a phenomenon or process under study. The results of data processing with the use of authorial method are presented for the case when the correlation analysis gives the result not exceeding the “significant” correlation, i.e. even the supporters of such errors leave these relations out of their view. All sufficiently strong dependences (the strength of relation coefficient 0.6 or more, a total of 26 dependences) are presented in the form of tables, and the quantile distributions for the dependences with the highest strength of relation coefficients (0.8 or more, a total of 13 dependences) are provided. Finally, we consider the sufficiently strong linear relation with a correlation coefficient of 0.6 or more.

**Keywords**—*simple nonlinear dependences; significant correlation; political preferences; system errors*

## I. INTRODUCTION

The psychologists (sociologists) keep speaking about the complex nature of their subject of research, i.e. psyche (mind), but in doing so they very seldom (except, for instance, in case of psychophysiology) consider in their studies the interpretations based on results of the correlation analysis and hence the mechanistic approach, the methodology of the late 18th century. Under such circumstances, the sciences that study “simpler” (as psychologists assert) subjects, such as physics, have passed in their methodological development the non-classical (the early 20th century) and post-non-classical (the late 20th century) stages of development.

In order to find a way out of this methodological deadlock, one must accept the fact that in their studies the psychologists (sociologists), along with linear relations, must also consider the simplest non-linear relations that have a psychological (social) meaning and explain many phenomena being, studied by psychology (sociology).

Postnonclassical ideas, synergetics, and non-linearity do not constitute any methodological basis for research for most

psychologists (sociologists). The best way to contribute to this is the traditionally imposed approach with the preliminary formulation of hypotheses, because a researcher’s traditional logic (natural human way of thinking) pushes to formulation of linear hypotheses, which should be mainly confirmed in future.

As a result, the psychologists (sociologists) have developed a research stereotype. On the one hand, it means not understanding and rejection of non-linearity as a basis of methodology (which is aggravated by the lack of accessible instruments for analyzing experimental data), while on the other hand, an attempt to cling to linear models and, not finding in them a solution to the problem (except just trivial results) make – knowingly or unknowingly – a substitution, which allows presenting very weak correlations (0.11-0.3) as meaningful ones, which makes it possible to speak about results supplied by a large set of detected relations between the parameters being studied.

Literature in the 1970s and 1980s, including the American one, interpreted such relation simply as very weak correlations, which were of no interest to the researcher.

This can be explained by lack of strong linear relations in the analysis, when mainly non-linear objects are studied, and a tool set representing some linear models is still used. In addition, the researchers do not want or do not realize that it is time for another analysis of experimental data in the context of synergetic paradigm and non-linear models. Although different theses often discuss synergetics at a philosophical and methodological level, but then it is deliberately forgotten when the real research results are described, and a classical interpretation (linearity, the principle of superposition, etc.) is often offered.

There is a usual paradoxical picture. In case of a sufficient sample of about 100 or more, the critical value will be about 0.2. Thus, a very weak correlation (0.2-0.3), called a “significant” one, is often interpreted as strong. Otherwise, what is the point to describe and interpret an unlikely event, to find out reasons thereof, and at the same time to ignore the opposite event, the probability of which is much greater? The authors in such situation describe the cause-and-effect relations, which are actually very weak, but since they are “significant”, they are “the only” possible for them. At the same time, many authors do not care what the correlation is,

0.2 or 0.9, and in both cases it is “significant” according to their rules, and the difference between these cases is of no interest.

Thus, a massive descending trend (intentional or unconscious) to the low values of correlation coefficient is traced, when “non-zero correlation” (hypothesis of zero correlation coefficient) becomes sufficient to describe the relation as strong. This may be attributed to a lack of strong linear relations in the analysis that have an absolute value more than 0.6, when any predominantly non-linear objects are studied. And the tools set is still being used representing the linear model, and the researchers do not want or do not realize that it is time for another analysis of experimental data in the context of synergetic paradigm and non-linear models.

## II. RESULTS

We'll look at the case study of political preferences of young people, which shows that ignoring the complex nature of the political realities perception and seeking to restrict the results of such studies by any mechanistic views lead not only to the loss of a large amount of information (represented by simple non-linear relations), but also to a lot of system errors in the results interpretation.

We consider the problem of “zero” correlations (type 1 error) using an example of students' political preferences study. 190 respondents were interviewed during the sociological research.

24 interval (ordinal) parameters were selected or constructed for the further relations study (linear and simplest non-linear):

1. Attitude towards civil marriage.
2. Acceptability of civil marriage as a form of relationship.
3. Possibility of childbirth in civil marriage.
4. The need to register a marriage in case of children born.
5. Interest to politics.
6. Participation in the discussion of political issues in their environment.
7. Attitude to the United Russia party.
8. Attitude to the Fair Russia party.
9. Attitude to the LDPR party.
10. Attitude to the CPRF party.
11. Attitude to the Yabloko party.
12. Attitude to V.V. Putin.
13. Attitude to D.A. Medvedev.
14. Attitude to V.V. Zhirinovsky.
15. Attitude to G.A. Zyuganov.
16. Attitude to M.D. Prokhorov.
17. Attitude to S.M. Mironov.

18. Attitude to A.A. Navalny.

19. Satisfaction with the voting results in the elections to the State Duma of the Russian Federation.

20. Satisfaction with the voting results in the elections of RF President.

21. Satisfaction with the work of Russian President Vladimir Putin.

22. Satisfaction with the work of the State Duma of the Russian Federation.

23. Age.

24. Subjective assessment of their financial situation.

In this article we consider the results for one of the two solved problems (for triads, independent variable quarters) to identify the relations between the variables under study, namely the problem for independent variable quarters.

**Let's show the identifications, which will be used in the offered tables:**

**SV** - factor of the connection strength determining the dependence of the parameter of the number N2 (**parameter**) from the parameter for the number N1 (**quarters**);

**SV'** - factor of the connection strength determining reverse (in relation to **SV**) dependence of the parameter with number N1 (**quarters**) from the parameter with number N2 (**parameter**);

**R** - the coefficient of linear correlation between parameters with numbers N1 (**quarters**) and N2 (**parameter**);

**N1** - number of the parameter, for which splitting on **quarters** is made;

**N2** - number of the parameter, which values are determined for the distinguished **quarter** of the **parameter** with number N1.

The **first** sample dependency (**Table I**) contains the strongest, the simplest non-linear dependences with a strength of relation coefficient **SV>0.8**, which simultaneously can be taken as zero, that are of no research interest and that do not fall even in the category of “significant” correlations. They are characterized by values from 0 to 0.14.

Value **0.14** is that Rubicon after which (for a sample of 190) the correlation in the research community is considered significant and noteworthy when interpreting its results in traditional linear models. Sociologists and psychologists (see numerous articles) too often make no difference in the correlation coefficient value: 0.14, 0.6 or even 1 is “significant” for them and that is more than enough.

Thus, we find 15 ( $0.8 < SV$ ) as strong, simplest non-linear relations, which are simply not considered in the correlation analysis (even by supporters of “significant” correlations). Linear correlation shows the results close to zero.

Next, we give these **15** dependencies (**Table II-XVI**) without description and interpretation in order to visualize the number of pseudoscientific results that can appear in any

study, when they rely only on linear correlations, going into linear models in interpreting the results, ignoring the real non-linear nature of sociological (psychological) information, including political preferences. And these are primarily the dependencies with the maximum or minimum.

**TABLE I. INTERVALS OF RELATION COEFFICIENTS:  $0 < \text{ABS}(R) \leq 0.14 \quad 0.8 < SV$**

	SV	SV'	R	quarters	parameter
1	1.25	0.06	-0.06	X01	X11
2	1.02	0.05	-0.03	X07	X06
3	0.81	0.63	-0.13	X07	X15
4	0.99	0.65	0.05	X07	X18
5	0.80	1.06	0.02	X07	X24
6	0.90	0.46	0.11	X09	X11
7	0.88	0.31	0.07	X14	X18
8	1.14	0.08	-0.08	X15	X12
9	1.03	0.17	-0.02	X16	X04
10	0.81	0.47	0.02	X17	X07
11	0.96	0.50	0.05	X17	X12
12	1.29	0.19	-0.13	X19	X05
13	1.06	0.80	0.02	X24	X07
14	0.81	0.07	-0.04	X24	X11
15	0.87	0.78	0.13	X24	X20

**TABLE II. DEPENDENCE OF THE PARAMETER "ATTITUDE TO THE YABLOKO PARTY" (X11) ON THE PARAMETER "ATTITUDE TOWARDS CIVIL MARRIAGE" (X01) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X11 FOR QUARTERS ON A SCALE X01**

Quarters on the scale X01	Comparative weightiness of the parameter X11 for quarters
X01-4	+256
X01-3	-1166
X01-2	+1586
X01-1	+20
Factor of the connection strength = 1.25 (0.06) Coefficient of correlation = -0.06	

**TABLE III. DEPENDENCE OF THE PARAMETER "PARTICIPATION IN THE DISCUSSION OF POLITICAL ISSUES IN THEIR ENVIRONMENT" (X06) ON THE PARAMETER "ATTITUDE TO THE UNITED RUSSIA PARTY" (X07) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X06 FOR QUARTERS ON A SCALE X07**

Quarters on the scale X07	Comparative weightiness of the parameter X06 for quarters
X07-4	+353
X07-3	-1495
X07-2	+771
X07-1	+216
Factor of the connection strength = 1.02 (0.05) Coefficient of correlation = -0.03	

**TABLE IV. DEPENDENCE OF THE PARAMETER "ATTITUDE TO G.A. ZYUGANOV" (X15) ON THE PARAMETER "ATTITUDE TO THE UNITED RUSSIA PARTY" (X07) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X15 FOR QUARTERS ON A SCALE X07**

Quarters on the scale X07	Comparative weightiness of the parameter X15 for quarters
X07-4	-1164
X07-3	+1257
X07-2	+172
X07-1	-50
Factor of the connection strength = 0.81 (0.63) Coefficient of correlation = -0.13	

**TABLE V. DEPENDENCE OF THE PARAMETER "ATTITUDE TO A.A. NAVALNY" (X18) ON THE PARAMETER "ATTITUDE TO THE UNITED RUSSIA PARTY" (X07) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X18 FOR QUARTERS ON A SCALE X07**

Quarters on the scale X07	Comparative weightiness of the parameter X18 for quarters
X07-4	-6
X07-3	+1207
X07-2	-1094
X07-1	-42
Factor of the connection strength = 0.99 (0.65) Coefficient of correlation = 0.05	

**TABLE VI. DEPENDENCE OF THE PARAMETER "SUBJECTIVE ASSESSMENT OF THEIR FINANCIAL SITUATION" (X24) ON THE PARAMETER "ATTITUDE TO THE UNITED RUSSIA PARTY" (X07) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X24 FOR QUARTERS ON A SCALE X07**

Quarters on the scale X07	Comparative weightiness of the parameter X24 for quarters
X07-4	+258
X07-3	-1056
X07-2	+638
X07-1	-32
Factor of the connection strength = 0.80 (1.06) Coefficient of correlation = 0.02	

**TABLE VII. DEPENDENCE OF THE PARAMETER "ATTITUDE TO THE YABLOKO PARTY" (X11) ON THE PARAMETER "ATTITUDE TO THE LDPR PARTY" (X09) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X11 FOR QUARTERS ON A SCALE X09**

Quarters on the scale X09	Comparative weightiness of the parameter X11 for quarters
X09-4	-213
X09-3	+1480
X09-2	-124
X09-1	-956
Factor of the connection strength = 0.90 (0.46) Coefficient of correlation = 0.11	

**TABLE VIII. DEPENDENCE OF THE PARAMETER "ATTITUDE TO A.A. NAVALNY" (X18) ON THE PARAMETER "ATTITUDE TO V.V. ZHIRINOVSKY" (X14) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X18 FOR QUARTERS ON A SCALE X14**

Quarters on the scale X14	Comparative weightiness of the parameter X18 for quarters
X14-4	-226
X14-3	-430
X14-2	+1243
X14-1	-919
Factor of the connection strength = 0.88 (0.31) Coefficient of correlation = 0.07	

**TABLE IX. DEPENDENCE OF THE PARAMETER "ATTITUDE TO V.V. PUTIN" (X12) ON THE PARAMETER "ATTITUDE TO G.A. ZYUGANOV" (X15) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X12 FOR QUARTERS ON A SCALE X15**

Quarters on the scale X15	Comparative weightiness of the parameter X12 for quarters
X15-4	-1603
X15-3	+313
X15-2	+1690
X15-1	-268
Factor of the connection strength = 1.14 (0.08) Coefficient of correlation = -0.08	

**TABLE X.** DEPENDENCE OF THE PARAMETER “THE NEED TO REGISTER A MARRIAGE IN CASE OF CHILDREN BORN” (X04) ON THE PARAMETER “ATTITUDE TO M.D. PROKHOROV” (X16) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X04 FOR QUARTERS ON A SCALE X16

Quarters on the scale X16	Comparative weightiness of the parameter X04 for quarters
X16-4	+443
X16-3	-519
X16-2	+1739
X16-1	+241
Factor of the connection strength = 1.03 (0.17) Coefficient of correlation = -0.02	

**TABLE XI.** DEPENDENCE OF THE PARAMETER “ATTITUDE TO THE UNITED RUSSIA PARTY” (X07) ON THE PARAMETER “ATTITUDE TO S.M. MIRONOV” (X17) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X07 FOR QUARTERS ON A SCALE X17

Quarters on the scale X17	Comparative weightiness of the parameter X07 for quarters
X17-4	-473
X17-3	+73
X17-2	+1340
X17-1	-572
Factor of the connection strength = 0.81 (0.47) Coefficient of correlation = 0.02	

**TABLE XII.** DEPENDENCE OF THE PARAMETER “ATTITUDE TO V.V. PUTIN” (X12) ON THE PARAMETER “ATTITUDE TO S.M. MIRONOV” (X17) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X12 FOR QUARTERS ON A SCALE X17

Quarters on the scale X17	Comparative weightiness of the parameter X12 for quarters
X17-4	-148
X17-3	+19
X17-2	+1790
X17-1	-680
Factor of the connection strength = 0.96 (0.50) Coefficient of correlation = 0.05	

**TABLE XIII.** DEPENDENCE OF THE PARAMETER “INTEREST TO POLITICS” (X05) ON THE PARAMETER “SATISFACTION WITH THE VOTING RESULTS IN THE ELECTIONS TO THE STATE DUMA OF THE RUSSIAN FEDERATION” (X19) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X05 FOR QUARTERS ON A SCALE X19

Quarters on the scale X19	Comparative weightiness of the parameter X05 for quarters
X19-4	-71
X19-3	-1420
X19-2	+1731
X19-1	+286
Factor of the connection strength = 1.29 (0.19) Coefficient of correlation = -0.13	

**TABLE XIV.** DEPENDENCE OF THE PARAMETER “ATTITUDE TO THE UNITED RUSSIA PARTY” (X07) ON THE PARAMETER “SUBJECTIVE ASSESSMENT OF THEIR FINANCIAL SITUATION” (X24) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X07 FOR QUARTERS ON A SCALE X24

Quarters on the scale X24	Comparative weightiness of the parameter X07 for quarters
X24-4	+1846
X24-3	-1000
X24-2	+431
X24-1	-174
Factor of the connection strength = 1.06 (0.80) Coefficient of correlation = 0.02	

**TABLE XV.** DEPENDENCE OF THE PARAMETER “ATTITUDE TO THE YABLOKO PARTY” (X11) ON THE PARAMETER “SUBJECTIVE ASSESSMENT OF THEIR FINANCIAL SITUATION” (X24) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X11 FOR QUARTERS ON A SCALE X24

Quarters on the scale X24	Comparative weightiness of the parameter X11 for quarters
X24-4	-150
X24-3	+357
X24-2	-444
X24-1	+1960
Factor of the connection strength = 0.81 (0.07) Coefficient of correlation = -0.04	

**TABLE XVI.** DEPENDENCE OF THE PARAMETER “SATISFACTION WITH THE VOTING RESULTS IN THE ELECTIONS OF RF PRESIDENT” (X20) ON THE PARAMETER “SUBJECTIVE ASSESSMENT OF THEIR FINANCIAL SITUATION” (X24) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X20 FOR QUARTERS ON A SCALE X24

Quarters on the scale X24	Comparative weightiness of the parameter X20 for quarters
X24-4	+2157
X24-3	-580
X24-2	+82
X24-1	-505
Factor of the connection strength = 0.87 (0.78) Coefficient of correlation = 0.13	

The **second** sample of dependencies (**Table XVII**) contains already less strong simplest non-linear dependencies with the strength of relation coefficient  $0.7 < SV \leq 0.8$ , which are also characterized by linear correlation values near zero from 0 to 0.14, even less than the threshold of the “significant” correlation loved by everyone. There were **13** such relations in this study.

**TABLE XVII.** INTERVALS OF RELATION COEFFICIENTS:  $0 < ABS(R) \leq 0.14$   $0.7 < SV \leq 0.8$

	SV	SV'	R	quarters	parameter
1	<b>0.74</b>	0.07	<b>0.09</b>	X01	X21
2	<b>0.74</b>	0.14	<b>0.09</b>	X03	X18
3	<b>0.80</b>	0.65	<b>0.03</b>	X03	X22
4	<b>0.74</b>	0.16	<b>0.07</b>	X07	X05
5	<b>0.77</b>	0.14	<b>0.05</b>	X09	X02
6	<b>0.76</b>	0.34	<b>-0.01</b>	X09	X18
7	<b>0.74</b>	0.63	<b>-0.04</b>	X10	X23
8	<b>0.71</b>	0.11	<b>0.13</b>	X14	X11
9	<b>0.77</b>	0.56	<b>-0.10</b>	X15	X21
10	<b>0.76</b>	0.56	<b>-0.07</b>	X17	X21
11	<b>0.71</b>	0.07	<b>0.08</b>	X19	X02
12	<b>0.78</b>	0.87	<b>0.13</b>	X20	X24
13	<b>0.79</b>	0.21	<b>0.04</b>	X24	X21

Thus, we find **13** ( $0.7 < SV \leq 0.8$ ) as strong, simplest non-linear relations, which are simply not considered in the correlation analysis (even by supporters of “significant” correlations). Linear correlation shows the results close to zero.

Next, we give these **13** (**Table XXVIII-XXX**) dependencies without description and interpretation in order to visualize the number of pseudoscientific results that can appear in any study, when they rely on “significant” correlations, going into linear models in interpreting the results, ignoring the real non-linear nature of sociological (psychological) information, including political preferences, and these are primarily the dependencies with the maximum or minimum.

**TABLE XVIII. DEPENDENCE OF THE PARAMETER “SATISFACTION WITH THE WORK OF RUSSIAN PRESIDENT VLADIMIR PUTIN” (X21) ON THE PARAMETER “ATTITUDE TOWARDS CIVIL MARRIAGE” (X01) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X21 FOR QUARTERS ON A SCALE X01**

Quarters on the scale X01	Comparative weightiness of the parameter X21 for quarters
X01-4	+548
X01-3	+72
X01-2	-1414
X01-1	+16
<b>Factor of the connection strength = 0.74 (0.07)</b>	
<b>Coefficient of correlation = 0.09</b>	

**TABLE XIX. DEPENDENCE OF THE PARAMETER “ATTITUDE TO A.A. NAVALNY” (X18) ON THE PARAMETER “POSSIBILITY OF CHILDBIRTH IN CIVIL MARRIAGE” (X03) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X18 FOR QUARTERS ON A SCALE X03**

Quarters on the scale X03	Comparative weightiness of the parameter X18 for quarters
X03-4	-190
X03-3	+1525
X03-2	-73
X03-1	-155
<b>Factor of the connection strength = 0.74 (0.14)</b>	
<b>Coefficient of correlation = 0.09</b>	

**TABLE XX. DEPENDENCE OF THE PARAMETER “SATISFACTION WITH THE WORK OF THE STATE DUMA OF THE RUSSIAN FEDERATION” (X22) ON THE PARAMETER “POSSIBILITY OF CHILDBIRTH IN CIVIL MARRIAGE” (X03) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X22 FOR QUARTERS ON A SCALE X03**

Quarters on the scale X03	Comparative weightiness of the parameter X22 for quarters
X03-4	+1483
X03-3	-936
X03-2	+143
X03-1	-36
<b>Factor of the connection strength = 0.80 (0.65)</b>	
<b>Coefficient of correlation = 0.03</b>	

**TABLE XXI. DEPENDENCE OF THE PARAMETER “INTEREST IN POLITICS” (X05) ON THE PARAMETER “ATTITUDE TO THE UNITED RUSSIA PARTY” (X07) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X05 FOR QUARTERS ON A SCALE X07**

Quarters on the scale X07	Comparative weightiness of the parameter X05 for quarters
X07-4	+590
X07-3	-1224
X07-2	+202
X07-1	+32
<b>Factor of the connection strength = 0.74 (0.16)</b>	
<b>Coefficient of correlation = 0.07</b>	

**TABLE XXII. DEPENDENCE OF THE PARAMETER “ACCEPTABILITY OF CIVIL MARRIAGE AS A FORM OF RELATIONSHIP” (X02) ON THE PARAMETER “ATTITUDE TO THE LDPR PARTY” (X09) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X02 FOR QUARTERS ON A SCALE X09**

Quarters on the scale X09	Comparative weightiness of the parameter X02 for quarters
X09-4	+279
X09-3	-53
X09-2	-1150
X09-1	+948
<b>Factor of the connection strength = 0.77 (0.14)</b>	
<b>Coefficient of correlation = 0.05</b>	

**TABLE XXIII. DEPENDENCE OF THE PARAMETER “ATTITUDE TO A.A. NAVALNY” (X18) ON THE PARAMETER “ATTITUDE TO THE LDPR PARTY” (X09) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X18 FOR QUARTERS ON A SCALE X09**

Quarters on the scale X09	Comparative weightiness of the parameter X18 for quarters
X09-4	-673
X09-3	+1194
X09-2	+78
X09-1	-412
<b>Factor of the connection strength = 0.76 (0.34)</b>	
<b>Coefficient of correlation = -0.01</b>	

**TABLE XXIV. DEPENDENCE OF THE PARAMETER “AGE” (X23) ON THE PARAMETER “ATTITUDE TO THE CPRF PARTY” (X10) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X23 FOR QUARTERS ON A SCALE X10**

Quarters on the scale X10	Comparative weightiness of the parameter X23 for quarters
X10-4	-993
X10-3	+826
X10-2	+181
X10-1	-746
<b>Factor of the connection strength = 0.74 (0.63)</b>	
<b>Coefficient of correlation = -0.04</b>	

**TABLE XXV. DEPENDENCE OF THE PARAMETER “ATTITUDE TO THE YABLOKO PARTY” (X11) ON THE PARAMETER “ATTITUDE TO V.V. ZHIRINOVSKY” (X14) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X11 FOR QUARTERS ON A SCALE X14**

Quarters on the scale X14	Comparative weightiness of the parameter X11 for quarters
X14-4	-1254
X14-3	+537
X14-2	+312
X14-1	-932
<b>Factor of the connection strength = 0.71 (0.11)</b>	
<b>Coefficient of correlation = 0.13</b>	

**TABLE XXVI. DEPENDENCE OF THE PARAMETER “SATISFACTION WITH THE WORK OF RUSSIAN PRESIDENT VLADIMIR PUTIN” (X21) ON THE PARAMETER “ATTITUDE TO G.A. ZYUGANOV” (X15) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X21 FOR QUARTERS ON A SCALE X15**

Quarters on the scale X15	Comparative weightiness of the parameter X21 for quarters
X15-4	-751
X15-3	-6
X15-2	+1402
X15-1	+32
<b>Factor of the connection strength = 0.77 (0.56)</b>	
<b>Coefficient of correlation = -0.10</b>	

**TABLE XXVII. DEPENDENCE OF THE PARAMETER “SATISFACTION WITH THE WORK OF RUSSIAN PRESIDENT VLADIMIR PUTIN” (X21) ON THE PARAMETER “ATTITUDE TO S.M. MIRONOV” (X17) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X21 FOR QUARTERS ON A SCALE X17**

Quarters on the scale X17	Comparative weightiness of the parameter X21 for quarters
X17-4	-1294
X17-3	+10
X17-2	+1061
X17-1	-70
<b>Factor of the connection strength = 0.76 (0.56)</b>	
<b>Coefficient of correlation = -0.07</b>	

TABLE XXVIII. DEPENDENCE OF THE PARAMETER “ACCEPTABILITY OF CIVIL MARRIAGE AS A FORM OF RELATIONSHIP” (X02) ON THE PARAMETER “SATISFACTION WITH THE VOTING RESULTS IN THE ELECTIONS TO THE STATE DUMA OF THE RUSSIAN FEDERATION” (X19) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X02 FOR QUARTERS ON A SCALE X19

Quarters on the scale X19	Comparative weightiness of the parameter X02 for quarters
X19-4	-131
X19-3	+1178
X19-2	-104
X19-1	-778
Factor of the connection strength = 0.71 (0.07) Coefficient of correlation = 0.08	

TABLE XXIX. DEPENDENCE OF THE PARAMETER “SUBJECTIVE ASSESSMENT OF THEIR FINANCIAL SITUATION” (X24) ON THE PARAMETER “SATISFACTION WITH THE VOTING RESULTS IN THE ELECTIONS OF RF PRESIDENT” (X20) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X24 FOR QUARTERS ON A SCALE X20

Quarters on the scale X20	Comparative weightiness of the parameter X24 for quarters
X20-4	+1188
X20-3	+127
X20-2	-1031
X20-1	+332
Factor of the connection strength = 0.78 (0.87) Coefficient of correlation = 0.13	

TABLE XXX. DEPENDENCE OF THE PARAMETER “SATISFACTION WITH THE WORK OF RUSSIAN PRESIDENT VLADIMIR PUTIN” (X21) ON THE PARAMETER “SUBJECTIVE ASSESSMENT OF THEIR FINANCIAL SITUATION” (X24) AS COMPARATIVE WEIGHTINESS OF THE PARAMETER X21 FOR QUARTERS ON A SCALE X24

Quarters on the scale X24	Comparative weightiness of the parameter X21 for quarters
X24-4	+2087
X24-3	-453
X24-2	-39
X24-1	+634
Factor of the connection strength = 0.79 (0.21) Coefficient of correlation = 0.04	

The **third** sample of dependencies (Table XXXI) contains even less strong simplest non-linear dependencies with the strength of relation coefficient of  $0.6 < SV \leq 0.7$ , which are also characterized by linear correlation values near zero from 0 to 0.14, even less than the threshold of the “significant” correlation loved by everyone. There were **16** such relations in this study.

TABLE XXXI. INTERVALS OF RELATION COEFFICIENTS:  $0 < ABS(R) \leq 0.14$   $0.6 < SV \leq 0.7$

	SV	SV'	R	quarters	parameter
1	0.60	0.32	0.00	X07	X01
2	0.65	0.05	-0.03	X07	X23
3	0.64	0.07	-0.03	X09	X15
4	0.65	0.11	-0.10	X12	X06
5	0.67	0.16	0.02	X13	X23
6	0.67	0.10	-0.07	X14	X07
7	0.63	0.81	-0.13	X15	X07
8	0.67	0.22	0.02	X15	X13
9	0.62	0.11	-0.07	X15	X19
10	0.65	0.15	-0.06	X15	X20
11	0.60	0.25	0.05	X17	X04
12	0.60	0.20	0.07	X18	X02
13	0.65	0.99	0.05	X18	X07
14	0.67	0.12	-0.07	X21	X14
15	0.65	0.80	0.03	X22	X03
16	0.63	0.74	-0.04	X23	X10

Thus, we find **16** strong, simplest non-linear relations, which are simply not considered in the correlation analysis (even by supporters of “significant” correlations). Linear correlation shows the results close to zero.

To conclude, we present a table with strong enough linear relations (Table XXXII, values of the correlation coefficient modulo more than 0.6) for a general comparison of the numbers of strong relations of various nature (linear, simplest non-linear). Such relations were deemed noteworthy for the researcher in the past until the troubled times came when complex sociological or psychological content became simplified to linear models through “significant” correlations, and any pseudoscientific information became common for a sociological and psychological science.

TABLE XXXII. INTERVAL OF CORRELATION COEFFICIENTS:  $0.6 < ABS(R) \leq 1$

	SV	SV'	R	quarters	parameter
1	0.89	0.92	0.67	X07	X12
2	0.88	0.91	0.65	X07	X19
3	0.83	0.90	0.62	X12	X20
4	0.92	0.88	0.66	X12	X21
5	1.01	0.85	0.61	X19	X21
6	0.90	0.85	0.62	X20	X21
	0.81	1.01	0.61	X21	X22
7	0.95	0.94	0.79	X01	X02
8	0.92	0.95	0.73	X12	X13
9	0.95	0.95	0.77	X19	X20

There were 10 such dependencies, with 6 of them linked by clearly related indicators, and easily predictable 4 remaining dependencies. Therefore, the obtained results suggest the mutual influence of the political preferences of young people, primarily based on non-linear dependencies.

However, the main thing highlighted at this point, is the fact that a large number of strong simplest non-linear relations remain “invisible”, they simply do not exist, and they are not included in the description of this or that study.

This is a **type 1 error** (in the author's notation). It may also be considered as gross, because a strong relation is “identified”, but it is a blind spot for the researcher. It is different in nature – the simplest non-linear, and therefore, to identify and interpret it, we need other statistical methods (not only the correlation analysis) and other (synergetic) methodology corresponding to the complex nature of social and mental phenomena and processes. And linear models, when even sufficiently strong relations are identified (with values of the correlation coefficient greater than 0.6), give an extremely limited idea with respect to the studied subject of research, strongly distorting the idea of the process or phenomenon under study, and, therefore, such results cannot be used in practice.

### III. CONCLUSION

We have demonstrated the work of the authorial method for statistical relations analysis on the specific study data in political sociology, when emphasis is placed on studying the simplest non-linear relations (primarily these are dependencies

with a maximum and minimum), and linear relations are identified as the particular type of dependencies.

This continues our research in the context of nonlinear nature with regard to social sciences (human sciences).

At the same time, the nonlinear nature of psychological and sociological data is not relevant for most researchers, although the nonlinearity of psychological and social has already been revealed in numerous studies [3-5, 7, 8, 12-15] with the help of the authorial method [1, 2].

As previously mentioned [6, 9-11], a set of the so-called "significant" correlation coefficients is proposed to avoid the frequent statement of absence of the results in the study (except when a large number of related indicators are analyzed for relation). In the past, this mainly referred to a testing of hypothesis of zero correlation coefficient, i.e. the calculated correlation for a sample transferred to the general population with a shift of zero point to the critical value determined by the sample size.

In this case, a very weak correlation (0.14-0.3), which is called "significant" (in module it is a larger table value within the null correlation hypothesis), is often interpreted as sufficiently strong and being of clear research interest, and the study of a corresponding component is considered to have achieved a positive result. The authors describe the linear cause and effect relation in such a situation, which is actually weak or even very weak, but since it is "significant", it is "the only" possible for them.

The problem of traditional research substitutions with consideration of linear "significant" relation both for the case of actual absence of relation (linear or simplest nonlinear), and for the cases of presence of strong simplest nonlinear relation, is considered in detail in previous articles of the author.

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