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NON-LINEAR NATURE OF TOLERANCE CHARACTERISTIC "SENSATION OF CLOSENESS TO ONE'S FAMILY"

Mikhail Basimov (a)*
*Corresponding author

(a) Russian State Social University, Moscow, Russian Federation, basimov_@mail.ru, +79032965083

Abstract

Over the last 20 to 25 years, the psychology has been mainly concerned with the study of not such simple processes that might fit into linear models. At the same time, the so called "meaningful," but very weak, correlation (0.2-0.3) is often interpreted by psychologists as a fairly strong one, which is worthy of attention when interpreting the results. This is connected with the shortage of really strong linear relations in the study of complex psychological objects. In doing so many grave errors are observed.

The article considers interpretations of six dependencies with a maximum and a minimum in the study of social tolerance. These are dependencies between types of tolerance as well as the relations of tolerance parameters and personality types in the framework of a personal self-portrait. In this case, the author chooses the parameter known as "The sensation of closeness to one's family", which acts as a cause or effect in the statistical relations with both the types of social tolerance. This parameter is considered to be the main and meaningfully integrative value. Other sensations include: "The sensation of closeness to people sharing your political convictions and positions", "The attitude to the idea that Russia's chief religion ought to be Orthodox Christianity", "The sensation of closeness to fellow students (fellow workers)", "The sensation of closeness to the people of one's own generation (age)", and the components of a personal self-portrait: "Type (I) Loyal," "Type (D) Adventurous".

Keywords: Closeness to one's family, non-linearity, comparative weightiness, factor of the connection strength, coefficient of correlation

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1. Introduction

Today's psychology, on the one hand, frequently deals with the complex nature of the subject of research in psychology, i.e. the obtaining of knowledge about the specifics of the human mind and personality. On the other hand, most psychologists offer an interpretation of mainly linear correlation relations in their data. But the experience shows (Basimov, 2017) that in the vast majority of cases, the linear dependencies make up only a small part of the strong dependencies while their contents are fairly trite and predictable.

2. Problem Statement

The problem is singled out by the statistics of using the words "non-linear" or "nonlinear" (except for the presentations of our team of authors) in the theses of the European congresses:

1. «11th Conference of the European Sociological Association 2013 (Torino)» in **10 theses** (a total of around 3000).
2. «12th Conference of the European Sociological Association 2015 (Prague)» in **11 theses** (a total of more than 3000).
3. «The 12th European Congress of Psychology (Istanbul, 2011)» in **3 theses** (a total of around 3000).
4. «The 14th European Congress of Psychology (Milan, 2015)» in **4 theses** (a total of around 2500).

It means that the psychologists and sociologists continue "to live" predominantly in the framework of the late 18th century methodology (dealing with the concepts of linearity, the principle of super-position, etc.). However, if they happen to mention the complex nature of the psychic and personal phenomena, in most studies this cannot be singled out statistically based on the analysis of experimental data.

In order to create the visibility of results in terms of the linear concept, the following is done. There is a sufficient selection, numbering around 100 units, in which case the critical value of the correlation coefficient (the checking of the hypothesis of the correlation coefficient being equal to zero) is roughly 0.2. Thus, the very weak correlation (0.2-0.3), which is called "meaningful", is often construed as fairly strong and worthy of attention in interpreting the results. One can observe here a massive swerve (done knowingly or unknowingly) toward the area of low values of the correlation coefficient. This can be explained by the shortage in the analysis of really strong linear relations of the absolute value exceeding 0.6, when the psychological objects under study are mostly non-linear by their nature, while the tools employed for the study are still of the linear type and the researchers do not wish to change the pattern or do not understand that the time has come for a different analysis of experimental data in the framework of non-linear dependencies and non-linear models.

For example, in an article of a candidate of technical and philosophic sciences, "The correlation analysis in sociological studies", an opinion is proposed and approved (judging by the article contents) from a textbook on the political sociology that in the sociological studies, the values of correlation

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coefficients above 0.5 do not occur very often. Therefore, it makes sense to consider those of them which are equal to or greater than 0.3, which testifies to a moderate inter-relation between the characteristic.

3. Research Questions

The study of non-linear relations by the author's method (Basimov, 2009) was tested in different psychological studies (Basimov, 2017) presenting diverse areas of the psychological science, such as the psychology of preschool children and teenagers, the political psychology, the ethno-psychology, the occupational psychology, the psychology of trust, the psychology of stress, the psychology of parenthood, the psychology of learning, the measuring of the value relations of a person "Me and Others", the study of the family upbringing as a factor that shapes the child's meaningful spheres, and the study of the dynamics of motivational and semantic formations in a student's personality, etc."

At present, it is possible to note a great number of works dedicated to the issues of tolerance. Those include the classification (typology) of kinds of tolerance (Kleiberg, 2012; Zhmyrova, 2006), a comprehensive analysis of the phenomenon of tolerance (Kadyrova, 2012) as a value that is accepted by a subject and motivates one's interaction with the surrounding world and itself proper (Chebykina, 2012), etc. They are mostly theoretical works dedicated, among other things, to philosophy.

The experimental works, as is the case with the bulk of sociological and psychological research, are based on the linear concepts, including the study of linear correlative relations, when problems arise pertaining to the absence of strong relations, excepting the obvious ones. This, in turn, leads to the temptation to describe the so-called "meaningful" correlations as fairly strong ones, thus obtaining many pseudo-scientific results and a visibility of a positive result of the research. Since the result is available, why then address the issue of achieving the complex non-linear reality in the framework of an experimental endeavor. It is possible to ponder over this issue in parallel, not based on results of specific studies. The humanitarians' love of synergism over recent years has been growing rather rapidly, but its methodology cannot actually be used in the experimental study without statistical presentation of the simplest non-linear relations between the parameters being studies (measured).

4. Purpose of the Study

The authors are considering the phenomenon of tolerance in the same manner as the issues of sociology and psychology primarily as a non-linear object, which can be demonstrated based on many results.

The synergic mode of thinking is that of the post-non-classical science. The "non-linearity" is a fundamental conceptual node of the new paradigm. The research on any psychological process and phenomenon will be deliberately simplified to the extreme and narrowed down by the external factors, if the researcher, engaged in the study of a multi-faceted psychological phenomenon, remains in the framework of linear concepts (Knjazeva, Kurdyumov, 2005; Krylov, 2000; Mainzer, 1994).

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5. Research Methods

Based on the author's method of multiple comparison, a new approach was elaborated for studying variously-shaped statistical dependencies, which method employs a generalized version of the multiple comparison method for quantile splitting (triads, quarters, quinters) of data by each parameter being measured, so that there is no need to preliminarily propose a hypothesis about the shape of dependence.

As a result, the strength and shape of dependence are determined while linear dependencies are established as a specific particular case. The proposed approach not only enables the simultaneous tracking of various types of non-linear dependencies, but also makes it possible to determine for which intervals of parameter, the values of those dependencies are observed. This allows a more precise interpretation of results.

6. Findings

Let us consider in this article the examples of dependencies between the types of social tolerance along with the relations of tolerance parameters and personality types. In doing so, a chief parameter – that meaningfully brings these dependencies together – was "The sensation of closeness to one's family". The first three dependencies were obtained in the model of studying the relations for the independent parameter triads, and the subsequent three – in the model for the independent parameter quarters.

1. Table 1 shows the dependence of the parameter "**The sensation of closeness to one's family**" (Y) on the parameter "**Sensation of closeness to people sharing political outlooks and positions**" (X) as comparative weightiness of parameter Y for triads on scale X:

Table 1.

Triads on scale X	**Comparative weightiness of scale Y for triads**
X-3	**+8117**
X-2	**-13676**
X-1	**+5202**

Factor of connection strength (SV) = 0.68
(feedback is weak = 0.24)
Coefficient of correlation (R) = 0.11

The mean level of sensation of closeness to people sharing the political outlooks and positions, i.e., the state of uncertain political tolerance/intolerance, is the cause of an extremely low value of the parameter "The sensation of closeness to one's family" with a comparative weightiness (-13676). On the whole, the process of formation of political tolerance negatively impacts the family relationship. But further on, its growth to the high level (3rd triad) significantly improves the family relationship, even to values somewhat larger (+8117) than the initial ones (+5202).

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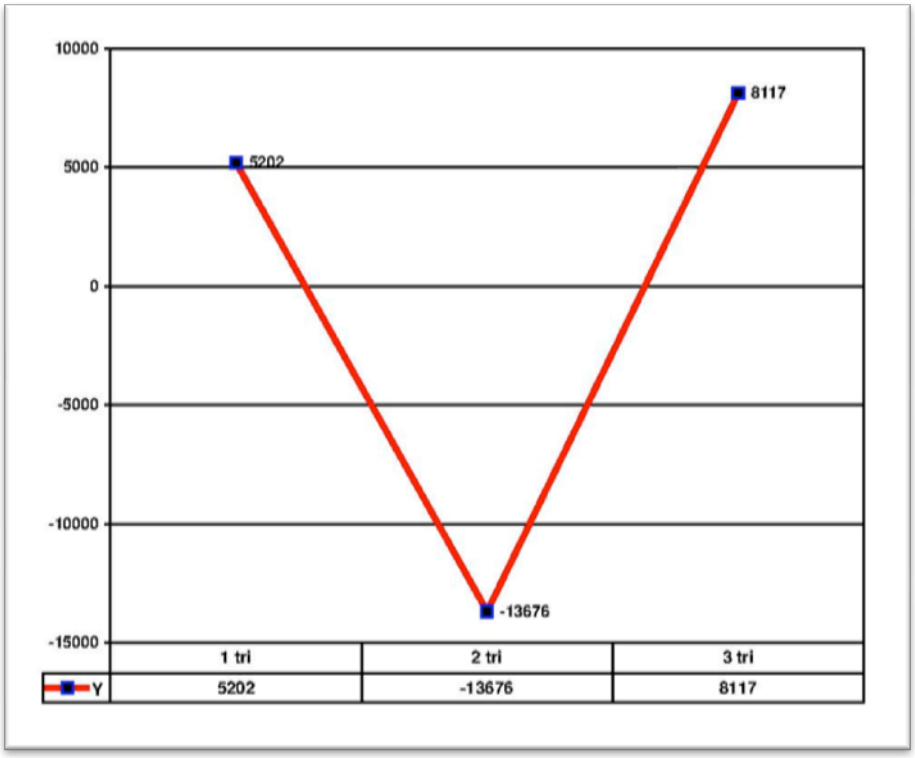

Figure 01. The chart of dependence of the parameter "Sensation of closeness to one's family" on the parameter "Sensation of closeness to people sharing political outlooks and positions"

The reverse dependency (dependency of X on Y) is weak, and the Factor of the connection strength is equal to 0.24. The dependency with a minimum that is being considered is close to symmetry, which is why the correlation coefficient is extremely small relative to the absolute value (0.11) and is of no interest even for adherents of the "meaningful" correlation. For them, this dependency is not just observed, it does not exist. The chart of dependence of the parameter "Sensation of closeness to one's family" on the parameter "Sensation of closeness to people sharing political outlooks and positions" is shown in Figure 1.

The following dependency is not so symmetrical in shape (1st and 3rd triads of the independent parameter essentially differ in the dependent parameter) and is obviously single-sided since the reverse dependency X(Y) is extremely weak (0.05) as compared to the direct dependency Y(X), for which the Factor of the connection strength is equal to 0.60. The correlation coefficient (-0.10) presents no interest either, just as in the case of the first dependency.

2. Table 2 shows the dependence of the parameter "**Attitude to the judgment that Orthodox Christianity must be Russia's chief religion**" (Y) on the parameter "**The sensation of closeness to one's family**" (X) as comparative weightiness of parameter Y for triads on scale X:

Table 2.

Triads on scale X	**Comparative weightiness of scale Y for triads**
X-3	**+369**
X-2	**-12466**
X-1	**+10734**

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Factor of connection strength (SV) = 0.60
(feedback is weak = 0.05)
Coefficient of correlation (R) = -0.10

The chart of dependence of the parameter "Attitude to the judgment that Orthodox Christianity must be Russia's chief religion" on the parameter "The sensation of closeness to one's family" is shown in Figure 2.

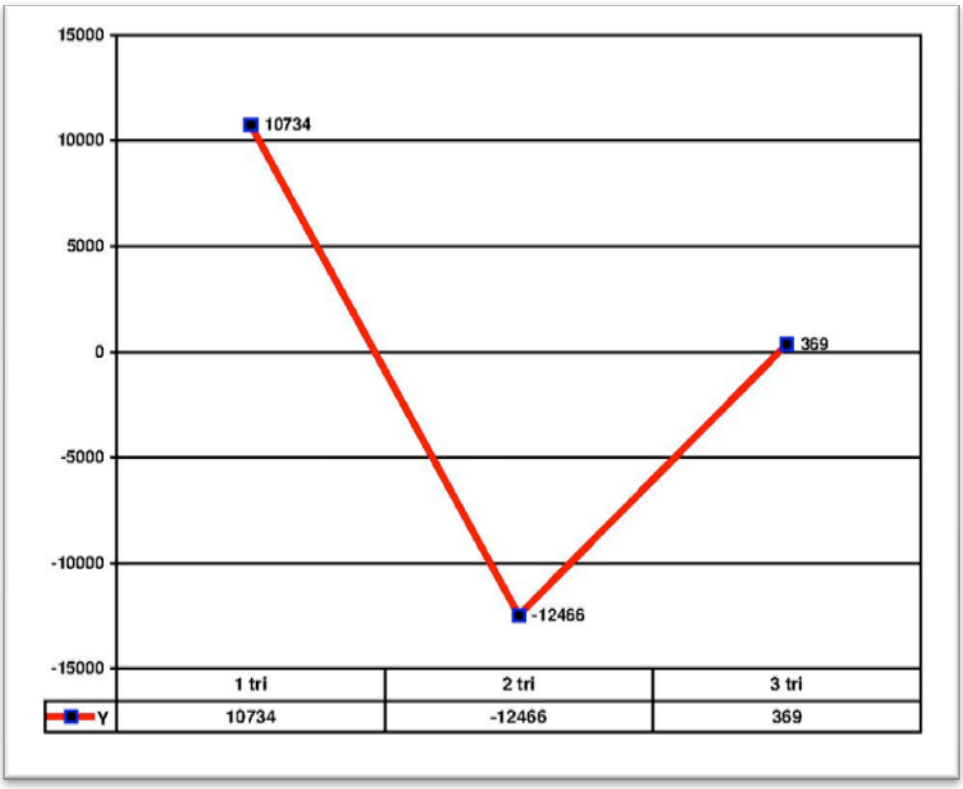

Figure 02. The chart of dependence of the parameter "Attitude to the judgment that Orthodox Christianity must be Russia's chief religion" on the parameter "The sensation of closeness to one's family"

In the dependency under consideration, the parameter "Sensation of closeness to one's family" acts already as a cause. At the stage of formation of closeness to one's family (2nd triad), a sharp slump (minimum) is observed relative to the judgment that Orthodox Christianity must be Russia's chief religion (-12466). It is only the emerged sensation (3rd triad) of closeness to one's family that compensates the attitude to religion (+369), though to considerably lower degrees than the initial ones (+10734) when closeness to one's family was estimated at a low level.

The psychologists and sociologists just ignore the previous two dependencies because of the negligent values of the correlation coefficient, which values do not fit the hypothesis of the correlation coefficient being equal to zero. At the same time, the following dependency demonstrates an example in which most scientists tend to regard the dependency as worthy of attention, given that it falls under the definition of "a meaningful correlation." In fact, however, this is a very weak dependence with a correlation coefficient equal to (-0.19), and in the framework of linear relations it must be of no interest whatsoever. But traditionally, the psychologists single out this dependency, thus committing, knowingly

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or not so, a gross error, when a strong dependency with a maximum is substituted with a fading linear dependency, which drastically changes the qualitative perception of the phenomenon under study.

3. Table 3 shows the dependence of the parameter "**Sensation of closeness to one's family**" (Y) on the parameter "**Type (I) Loyal**" (X) as comparative weightiness of parameter Y for triads on scale X:

Table 3.

Triads on scale X	**Comparative weightiness of scale Y for triads**
X-3	**-17846**
X-2	**+18610**
X-1	**+802**

Factor of connection strength (SV) = 0.91
(feedback is weak = 0.14)
Coefficient of correlation (R) = -0.19

The chart of dependence of the parameter "Sensation of closeness to one's family" on the parameter "Type (I) Loyal" is shown in Figure 3.

The mean level of the expressiveness of the personal self-portrait's component "Loyal (dependent) type" is the cause of the maximum expression of the sensation of closeness to the family (comparative weightiness = +18610), which is a significantly higher value than in the case of the 1st triad (+802).

Representatives of the loyal type respect the institute of marriage as well as unofficial amorous commitments. They prefer a company with a single person in the group. They are contactable, respectful toward the authorities, willingly rely on others, and understand well the tasks set by the executives. In decision-making they prefer to seek the opinions of others and follow advice given to them. They are cautious, tactful, polite and submissive. They are considerate of others and are organizers of comfortable amenities for VIPs.

However, the sharp rise on the "Loyal type" scale promotes the formation of a person with disturbances and dependences, who becomes incapable of expressing independence. Such people are helpless. They display strength and self-respect when and if they become "connected" to others. They are always fearful of losing the person they are connected to. They cannot bear the thought of remaining alone. In the case under consideration, the high level in relation to this component of the personality type fosters a complete loss of sensation of closeness to one's family (comparative weightiness = -17846) to the values that are much smaller than the initial ones (1st triad).

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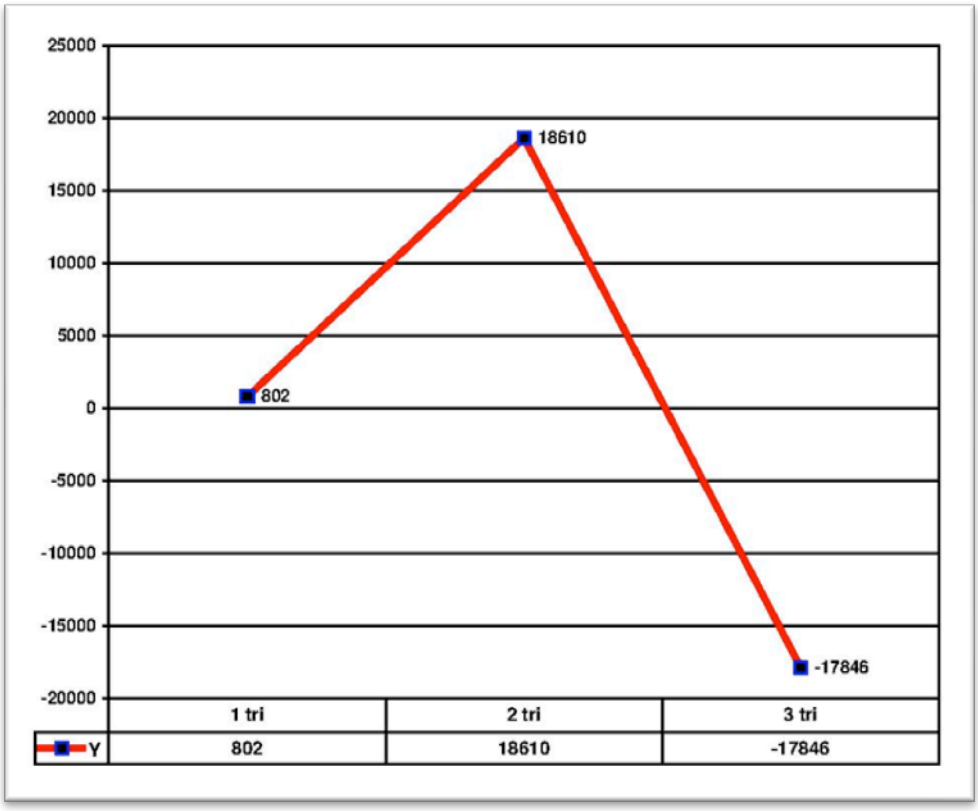

Figure 03. The chart of dependence of the parameter "Sensation of closeness to one's family" on the parameter "Type (I) Loyal"

The next three dependencies with a parameter that are of interest were spotted in modeling a dependency for independent parameter quarters.

4. Table 4 shows the dependence of the parameter "**Sensation of closeness to one's family**" (Y) on the parameter "**Sensation of closeness to fellow students (workers)**" (X) as comparative weightiness of parameter Y for quarters on scale X:

Table 4.

Quarters on scale X	**Comparative weightiness of scale X for quarters**
X-4	**+29755**
X-3	**-247**
X-2	**-20615**
X-1	**-6**

Factor of the connection strength (SV) = 0.89
(feedback is weak = 0.30)
Coefficient of correlation (R) = 0.29

The sensation of closeness to one's family depending on the parameter "Sensation of closeness to fellow students (workers)" has a maximum value of (+29755) for the 4th quarter of the parameter-cause, when the sensation of closeness to fellow students (workers) is also characterized by the largest values (25% of the largest values).

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The chart of dependence of the parameter "Sensation of closeness to one's family" on the parameter "Sensation of closeness to fellow students (workers)" is given in Figure 4.

The obtained result is not just a monotonous growth, but a fairly sophisticated and controversial process in which the initial increase of the cause (transition from the 1st to the 2nd quarter) is characterized by a significant reduction of the dependent parameter to the minimum value (-20615). Only after this, a sharp increase takes place in the parameter "Sensation of closeness to one's family" up to its maximum value (+29755).

In this case, if one remains in the framework of linear notions, this complex process will be missed, since following the rules were adopted by the psychologists' community, we shall regard the very weak correlation (0.29) as "meaningful" and construe the dependency as a proportionately growing function. So the cause and the effect will be determined based on the researcher's subjective desire.

In fact, this dependency is obviously single-sided since the reverse dependency's Factor of the connection strength X(Y) is equal to (0.30), which is significantly less than the Factor of the connection strength (0.89) for the direct dependency Y(X).

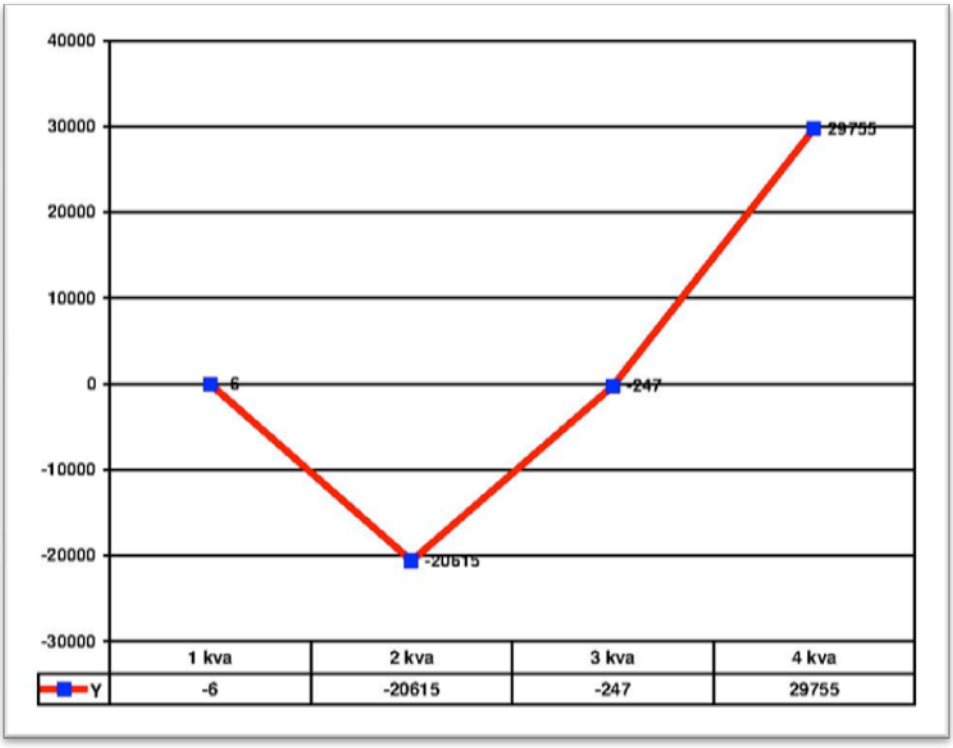

Figure 04. The chart of dependence of the parameter "Sensation of closeness to one's family" on the parameter "Sensation of closeness to fellow students (workers)"

The following dependency is approximately the same: with a minimum (-26270) on the 2nd quarter and very positive dynamics (from -9852 to +22331), with a fairly weak correlation dependence.

5. Table 5 shows the dependence of the parameter "**Sensation of closeness to one's family**" (Y) on the parameter "**Sensation of closeness to people of the same generation (age group)**" (X) as comparative weightiness of parameter Y for quarters on scale X:

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Table 5

Quarters on scale X	Comparative weightiness of scale X for quarters
X-4	+22331
X-3	+5016
X-2	-26270
X-1	-9852

Factor of connection strength (SV) = 0.82
(feedback is weak = 0.46)
Coefficient of correlation (R) = 0.34

6. Table 6 shows the dependence of the parameter "**Sensation of closeness to one's family**" (Y) on the parameter "**Type (D) Adventurous**" (X) as comparative weightiness of parameter Y for quarters on scale X:

Table 6.

Quarters on scale X	Comparative weightiness of scale X for quarters
X-4	-16667
X-3	-596
X-2	17055
X-1	3294

Factor of connection strength (SV) = 0.60
(feedback is weak = 0.12)
Coefficient of correlation (R) = -0.19

The first mean level of the component expressiveness in the personal self-portrait "Adventurous type" is the cause of maximum experience of closeness to one's family (comparative weightiness = +17055), which is much more than in the case of the 1st quarter (+3294).

People of the adventurous type are fond of risk and participate in the most dangerous of undertakings. They are good at acquiring friends and buddies and at influencing people. Usually, they are physically strong, virile, and tough. The adventurers live in the world of their imagination, feeling no guilt for the past or anxiety over the future.

The pronounced accentuation on this scale when respondents reject the rules and social conventions and are able, for their personal gain, to deceive and misinform, to behave inconsistently, to be indifferent and aggressive to others. It reduces the sensation of being close to one's family (-16667) in the case of the 4th quarter of the adventurous type.

Also, this dependency is an example of how most scientists prefer to regard the dependency as worth considering because it falls under the definition of "the meaningful correlation." However, in fact this is a very weak dependency with a correlation coefficient equal to (-0.19), and in the framework of linear relations it is of no interest whatsoever. Nevertheless, the psychologists traditionally single out this dependency, thus committing, knowingly or not, a gross error, in which case a strong dependency with a maximum is substituted with a linear decreasing dependency, which fact radically changes the qualitative understanding of the phenomenon under study. Besides, based on the correlation coefficient, it is possible to arbitrarily establish what is the cause and what is the effect. As a matter of fact, however, the dependency is obviously single-sided, which is determined by the small value (0.12) of the Factor of the

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connection strength for the reverse dependency X(Y) as compared to the Factor of the connection strength (0.60) for the direct dependency Y(X).

7. Conclusion

The examples considered above graphically show the problem of weak (even very weak) correlations (both positive and negative) which are often presented, for lack of other strong relations, under the guise of “meaningful” correlations as relations that are worth discussion and interpretation in terms of linear notions.

While the first mistake (dependencies 1 and 2), (of which one is or is not aware) just presents the desired thing as an actual fact, which does not exist, so that there is neither linear nor simplest non-linear relation, the second mistake (dependencies 3-6) may be regarded as a gross blunder, since the relation “is detected”, but in point of fact it does exist and is fairly strong, though different in nature, i.e., non-linear (with maximum or minimum). This means that in order to detect and interpret it, other statistic methods are needed and other (synergic) methodology is required that correspond to the complex nature of psychological phenomena and processes. As for linear models, they give a false image of subject under study and put the “scientific” psychology down nearly to the level of pseudo-science which results cannot be used by a practicing psychologist who must, based on results of his work with the customer, have a positive outcome.

Once an analysis of the simplest non-linear relations is undertaken, many problems of discrepancy of results of the scientific research and practical experiment would be gradually resolved.

Implementation of this approach will help psychologists not to commit systematic and technical errors in their research, which errors fully distort the experimental data and lead to serious mistakes, many of which may be found in articles of different publications. Otherwise, one can only ignore the quantitative research and regard, as an alternative, an intuitive solution to research problems not corroborated by experimental results.

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