

Psychological and Legal Aspects of Verification and Detection of Lies during Polygraph Examination

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Abstract: *The article examines the features of verification and detection of lies and the definition of their features in the process of polygraph examination. Detection of lies is associated with the experience of certain emotions, the mechanisms of functioning of which ensure the organization of the relationship between true and false answers during testing using the technical means of computer polygraph and are accompanied by physiological reactions. In a computerized polygraph test, a test taker analyzes and evaluates the risks of concealing false information or the possibility of confirming it and exposing it as false. The effectiveness of information concealment depends on its ability to reveal and control a specific picture of one's own physiological reactions when answering the questions, which are then evaluated by a polygraph examiner. Instrumental detection during polygraph testing should aim to obtain information, avoiding ambiguity, doubt, assumptions, and subjective association with an adequate reflection of reality. Undoubtedly, there is information that characterizes certain actions performed by a person, which he/she interprets and submits in the form of a true or false answer to a question evaluated by a polygraph examiner. The effectiveness of methods of detection and verification of lies depends on the qualification of the polygraph specialist, taking into account the individual characteristics of each test case, as well as the subtleties and details of the event being studied, features of psychophysiological reactions of the person being examined, namely the type of nervous system, external and internal factors that significantly influence the result of the examination. The conducted empirical research made it possible to describe the features of the group of people in whom lies were detected during polygraph testing. Such individuals showed high rates of adaptability, but low rates of neuropsychological stability. Among the personal qualities a high level of manifestation on such scales as "reactive aggression", "spontaneous aggression", "irritability", "shyness", "openness", "extraversion-introversion" can be distinguished.*

Keywords: *lie; deception; detection; verification; lawyer; advocacy; polygraph examination.*

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Introduction

Timely receipt of information and its reliability is one of the important conditions for successful prevention, investigation and detection of crimes. In modern conditions of organization of operative-search activity the use of reliable, fast and economical ways of increase of efficiency of their detection and reduction of number of judicial errors becomes more and more popular. Recently, a polygraph (lie detector) has been used quite often in criminal proceedings and forensic examinations as a device that successfully helps in lie detection by recording human psychophysiological reactions (respiration, pressure, pulse, vascular tone, skin galvanic reactions, etc.).

Conducting specialized psychophysiological research and examinations using a polygraph allows to achieve high results in verifying the accuracy of information and contribute to the effectiveness of criminal proceedings.

The basis for the application and conduct of polygraph examinations by law enforcement agencies of Ukraine is the Law "On operational and investigative activities" of 18.02.1992 №2135-XII. Article 8 of this Law enshrines the right of bodies carrying out operational and investigative activities to interrogate persons with their consent (paragraph 1, part 1, Article 8) (On operative-search activity, 1992).

However, the information obtained during the polygraph examination cannot be used as evidence in the case, but only as a guide for gathering official evidence.

Also, in accordance with the scientific and methodological recommendations on the preparation and appointment of forensic examinations and expert studies (Order of the Ministry of Justice of 08.10.1998 №53 / 3) a survey using a special technical means – a computer polygraph is provided (Instruction on the appointment and conduct of forensic examinations and expert research ..., 1998; Application of computer polygraphs in ..., 2017).

The conclusion of the expert (polygraph examiner) has in this case all the necessary attributes of independent proof. *The purpose* of the article is to study the psychological and legal aspects of verification and detection of lies during polygraph examinations. Study of the recent research on the problem made it possible to put forward *the hypotheses*: effective use of a polygraph, detection and verification of lies in the process of polygraph

examination will help in solving the problem of involvement / non-involvement of persons in the commission of crimes.

Ultimately, information disseminated in the process of communication is always characterized by reliability or unreliability. Its unreliability is characterized by untruthfulness, distortion and falsification of information reflected in various kinds of lies. All kinds of lies are aimed at building trust and belief in the veracity of the information provided.

Literature review

On the whole, the process of verification and detection of lies is multifactorial and affects a large number of verbal and nonverbal aspects of communication. A large number of lawyers and psychologists try to scientifically investigate and confirm the exact criteria for assessing and the relationship between such phenomena as the emotional response to the desire to hide information, changes in psychological state caused by certain stimuli and psychological state in the process of hiding information. In particular, researchers and scientists who have studied various aspects of the declared in the article scientific and applied problem, it is advisable to divide into groups, and therefore: the issues of ontological definition of lies, misleading and dishonesty are examined in the works of J. Adler (Adler, 2015), A. Barber (Barber, 2020), N. Marsili (Marsili, 2020), B. Neubauer, C. Witkop and L. Varpio (Neubauer, Witkop & Varpio, 2019); Yu. Boiko-Buzyl (Boiko-Buzyl, 2021), T. Brennen and S. Magnussen (Brennen & Magnussen, 2020), B. DePaulo, J. Lindsay, B. Malone, L. Muhlenbruck, K. Charlton and C. Harris (B. DePaulo & C. Harris, 2003), B. Khomulenko (Khomulenko, 2012), M. Kuzmenko and I. Sitkar (Kuzmenko & Sitkar, 2020), B. Neubauer, C. Witkop and L. Varpio (Neubauer & Varpio, 2019), C. De Roller and N. Piccoli (De Roller & Piccoli, 2017) devoted their works to the issue of psychological determination of deception and lies; after all, M. Acklin and J. Velasquez (Acklin & Velasquez, 2021), I. Hamlin, P. Taylor and L. Cross (Hamlin & Cross, 2020), L. Hammarstrom, D. Andreassen, O. Hellzen and M. Haggstrom (Hammarstrom & Haggstrom, 2020), W. Iacono and G. Ben-Shakhar (Iacono & Ben-Shakhar, 2019), J. Kamorowski, Karl Ask and M. Jelčić (Kamorowski & Corine de Ruiter, 2021), S. Samuel, H. Thapliyal and P. Kacker (Samuel & Kacker, 2019), K. Shapoval (Shapoval, 2020), O. Tsilmak (Tsilmak, 2019, pp. 201-209) conducted their research on the psychological and legal aspects of the study of lie detection including the use of a polygraph. Despite the fact that much has already been devoted to work and scientific research on this topic, but the issues of verification and detection of lies using a polygraph have not yet been fully explored. All this

justifies the relevance and purpose of the article, which is to study the psychological and legal aspects of verification and detection of lies during polygraph examinations.

Methodology

The methodological component of the study is formed on the basis of general and special methods of scientific knowledge. Thus, the system method made it possible to identify a number of scientific problems of studying the multidimensionality of verification and lie detection using a polygraph as a whole. In turn, the logical-semantic method helped to reveal the conceptual apparatus of research as much as possible, in particular to consider such terms as: "lie", "deception", "polygraph examination", "advocacy", "citizen", "person", "law", "psychological examination", "detection", "verification" and others.

Documentary analysis as a method of scientific knowledge is used in the study to formulate practical recommendations for the study of psychological and legal aspects of verification and detection of lies during polygraph research. The method of comparison made it possible to learn international experience in studying the psychological and legal aspects of detecting lies in research using a polygraph and other aspects identified in the scientific article, as well as the possibility of implementing this experience in Ukrainian realities. In addition, the study used the features of the statistical characteristics of the studied phenomena, in our case - the verification and detection of lies during polygraph studies

Results

Verification means confirmation of compliance of information and data with the standard requirements. With regard to statements, all standard requirements for statements must comply with four basic rules: Watch, listen, memorize; Observe and compare; Analyze all points of view; Do not accept contradictions (Adler, 1997, pp. 435-452; Barber, 2020, pp. 141-164; Brennen & Magnussen, 2020).

Lie detection is the assessment of a verbal statement in order to detect possible deliberate deception. Detection of lies is a cognitive process of recording deception, assessing the content of the message, including nonverbal cues (Kalka, Tsyvinska & Zubach, 2017, p. 63).

According to the emotional model of instrumental lie detection, N. Marsili and R. Moreton identifies verbal messages that are lies if they meet the following criteria: 1. information possessed by a person, is subjectively

assessed by him/her as true, that is such that corresponds to reality; 2. verbally reproduced information is subjectively perceived by a person as not corresponding to reality; 3. the transfer of information by a person is initiated with the aim of deliberately creating in the interlocutor an incorrect, distorted view of reality (Marsili, 2020; Moreton, 2020).

Thus, in the context of this model, a lie is defined as a verbal message, intentionally distorted truth known to a person, which he/she deliberately conceals by misleading the interlocutor.

Thus, Yu. Boiko-Buzyl believes that in the detection of lies one should rely on the activity or passivity of the liar and the forms of lies that each type "produces". Thus, depending on the individual-typological features of the personality, "false denial" is used by melancholy, apathetic, calm people, that is they mostly focus on denying or hiding false information. Individuals who focus on inventing and misrepresenting false accusations are usually distinguished by active cognitive activity, flexibility, etc. (Boiko-Buzyl Yu., 2021, p. 28-37).

Also the following facts can be characteristic signs of lying of the interlocutor: reporting by a person of different facts on one occasion; uncertainty, vagueness of information contained in the voiced version of the narrator; the presence of coincidences of the smallest details in the stories of different people about the same thing; "Letting out" in statements that indicate the denial of the voiced details of the narrator's version; the presence of sound gaps and an increase in the number of word-parasites; accompanying the story with a poor emotional background (schematicity, facelessness); persistence of the narrator in the truth of his words; evasion of answering direct questions; concealment of obvious facts that could not be unknown (Hamlin, et al., 2020; Hammarstrom, et al., 2020; Rollero, 2017; Shaw, 2020; Khomulenko, 2012).

There are two approaches to detecting lies – direct and indirect. The direct approach is to compare the content of the received information with the established reality. Based on the results of such a comparison, it is possible to draw a conclusion about the presence or absence of distorted information. The direct approach is expressed in comparing the content of the received information with the knowingly established reality. Based on the results of this comparison, we can conclude that there is or is no distorted information. The indirect approach is based on the presence or absence of lies through the analysis of indirect diagnostic signs in a person's reactions.

The use of a direct approach involves the possession of true information with which to compare. For a specialist, this method facilitates obtaining a positive result of polygraph examination. There are often cases

of lack of primary information, which limits the use of a direct approach (Kalka, Tsyvinska & Zubach, 2017; Rollero, 2017).

The use of an indirect approach is beyond comparison, it requires qualification and strict adherence to rules and requirements, but with a high probability of the results obtained it may indicate the presence or absence of deliberately hidden information.

To prevent misinterpretation of the identified signs of lies, it is important to create a "holistic model of behavior" of a particular subject, to establish his/her background emotional state, individual characteristics of reactions, communication style, and the specifics of the event and stress effect on the psychoemotional state of a person being examined.

DePaulo points out the importance in the detection and verification of lies of verbal and nonverbal signs, including: restraint of speech and behavior, excessive control (reactions are slow, speech is clear and balanced); stories are less convincing; signs of anxiety and danger (distancing, lack of immediacy); high tension; false information is characterized by fewer details, shortcomings, and is excessively correct (DePaulo, Malone & Harris, 2003).

An important aspect in the detection and verification of lies are the peculiarities of establishing contact, individual psychological characteristics of the person, the peculiarities of response and general emotional state. All this can be successfully traced in the process of polygraph examination during the discussion of neutral topics. The defined "background" zone is perceived as neutral. Deviation from this "background" is considered a reaction and is part of the "control" or "significant" zone. A significant zone refers to the discussion of the directly studied event, and the control zone involves a conversation on a topic that is not related to this event, but is dangerous for the subject being examined, and is accompanied by distortion of information that may confirm psychophysiological reactions on the polygraph.

In addition to the above features, the following characterizes a person who hides the truth:

- Strong denial, which, unlike true interlocutors, tends to weaken over time.

- Often a person suspected of lying changes the title and form of address to the interlocutor.

- Instead of explaining the details, the subject often makes general statements, such as "I was raised wrong!", "Why should I do something like that?".

– He/she often begins the story of the situation with the following phrases: "You will not believe me, but...", "Understand me correctly...", "I do not intend to mislead you...", etc.

– In the content of the answer there are syntactic changes, or the structure of the sentence is broken, the connection between words is broken.

– There is a series of indirect answers to questions such as, "I don't remember this," "Basically, I should remember this if it happened," and so on.

– The subject often interrupts the question with an answer without waiting for the question to end.

– There are repetitions of the question, which allows a person to come up with a more plausible answer (Samuel, Chatterjee, Thapliyal & Kacker, 2019; Widacki, 2019; Barber, 2020, pp. 141-164).

In a polygraph examination, the person being examined always assesses the risks of concealing true information or the possibility of confirmation. The success of assessing the presence or absence of a lie depends on the ability to show the physiological picture of reactions when answering questions evaluated by a polygraph examiner.

The main task facing the specialist in the testing process is to qualitatively and quantitatively assess changes in registered psychophysiological indicators and formulate an objective conclusion.

Analyzing the above, we can conclude that instrumental detection with a polygraph should aim to obtain information, avoiding ambiguity, doubts, assumptions, impartiality in interpretation and subjective association with adequate reflection of reality.

However, the effectiveness of lie detection and verification methods depends on the qualification level of the specialist, individual approach to each examination, taking into account the smallest details of the event, psychophysiological characteristics of persons, which include not only the type of nervous system but also external and internal factors influencing the effectiveness of the examination.

The empirical study involved individuals of different ages and occupations. The sample consisted of individuals aged 24 to 46.

With regard to professional orientation, among the subjects were both candidates for positions (of different professional orientation: drivers, managers, accountants, economists, etc.), who were selected by polygraph testing, and persons engaged in professional activities and passed scheduled polygraph testing.

The following methods were chosen as psychodiagnostic tools: methods of diagnosis of socio-psychological adaptation of K. Rogers – R. Diamond; Freiburg Personality Inventory Questionnaire (FPI), methods for determining the level of subjective control (LSC); coping-test of K. Lazarus; test for self-assessment of personality stress resistance; multi-level personal questionnaire "Adaptability" (MPQ - AM) (Verigin, Meijer, Bogaard & Vrij, 2019; Widacki, 2019, pp. 203-222; Boiko-Buzyl, 2021, pp. 28-37; Hamlin et al., 2020).

All subjects were conditionally divided into 2 groups according to the results of processing the results of polygraph examination: Group I – persons in whose answers to most of the test questions lies were found; Group II – persons, who were mostly characterized by truthful answers during the test.

If we compare the indicators of adaptability by the method of "Adaptability", it should be noted that in the persons being examined some of the scales have significant differences (Fig. 1).

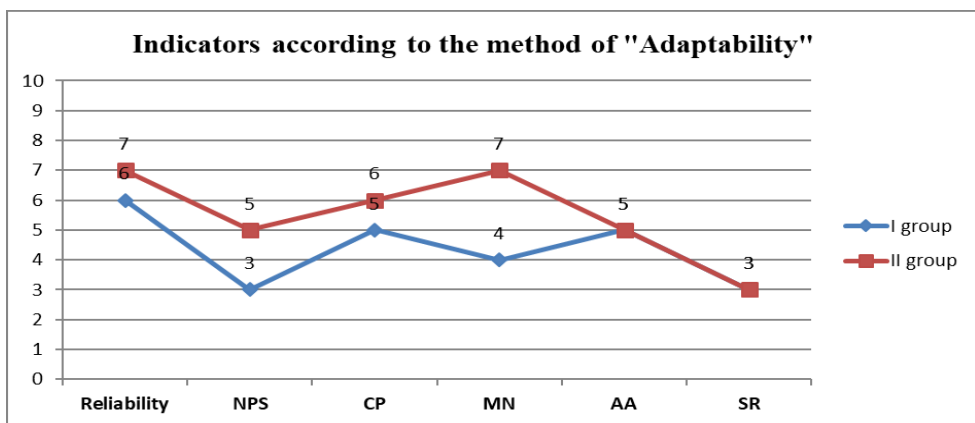


Fig.1. Indicators according to the method of "Adaptability"

In the first group (with a predominance of lies in the answers) the highest scores are on the scales "Adaptive Abilities" (AA), and the lowest – "Neuro-psychological stability" (NPS). Undoubtedly, people who demonstrate the manifestations of lies during the examination on the polygraph, show the mobilizing capabilities of the body and psyche, which is reflected in higher rates of stability and adaptability.

Thus, in the second group (persons with the majority of truthful answers) the highest indicators are on the scales "Reliability" and "Moral norms" (MN), and the lowest on the scales "Suicide risk" (SR). Such persons

are sincere in their answers, so the indicator related to moral norms is higher, because by demonstrating a truthful answer they are not in conflict with their own moral and ethical principles.

According to the results of the Freiburg Personality Inventory Questionnaire (FPI), the personal profile of the subjects who showed lies during the polygraph examination is characterized by the manifestation of the following features (Fig. 2):

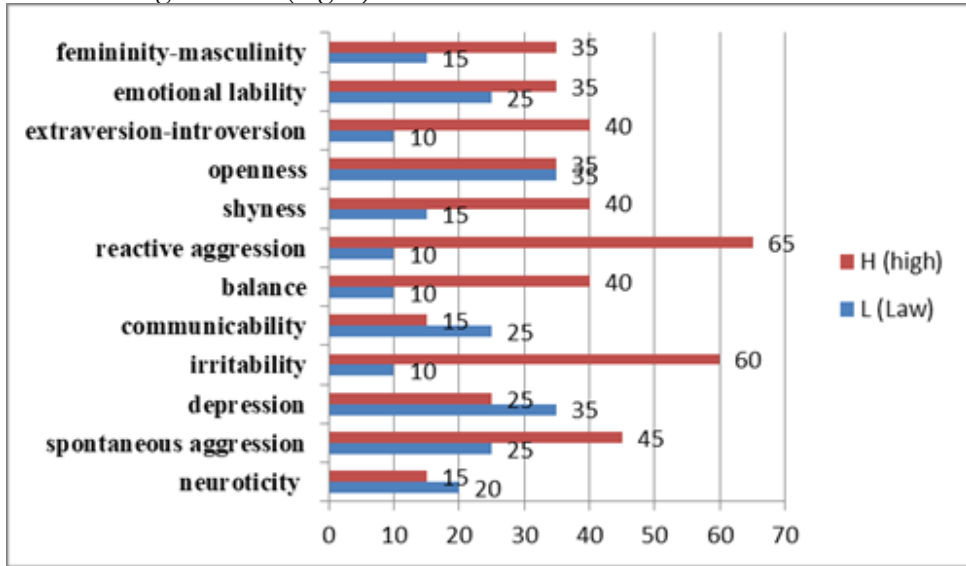


Fig. 2. The results of the study by the method of FPI (persons with manifestations of lies in the answers)

1) High indicators on the scale "Neuroticity" were recorded only in 15% of subjects, low indicators – 20%. This shows that these individuals in the group do not focus on their own feelings and problems and, as a result, do not express a nervous response. However, the ability to regulate emotions that do not manifest externally, still has its own version of the manifestation in the psychophysiological aspect during the examination on the polygraph.

2) High indicators on the scale "Spontaneous aggression" were recorded in 45% of subjects, low indicators – 25%. This suggests that most members of the group are characterized by an increased level of psychopathization, which creates the conditions for impulsive behavior and may be an option for a situational response to the desire to hide false information.

3) High indicators on the scale "Depression" are observed in a small number of subjects (25%), that is signs of depressive syndrome, which manifests itself in emotional state, behavior, in relation to oneself and the social environment are absent.

4) High scores on the scale "Irritability" were recorded in 60% of subjects, which indicates that individuals who show false answers during polygraph examination are characterized by emotional instability and a tendency to react affectively to avoid tension that arises in the testing situation.

5) High indicators on the scale "Communicability" are observed in 15% of subjects, low indicators – 25%. Most indicators of this group of subjects show the average level of need for communication, can use communication as a way to influence the polygraph examiner in the process of interaction with him.

6) High indicators on the scale "Balance" were recorded in 40% of subjects, which indicate good protection against the stressors of ordinary life situations, which are based on self-confidence, optimism and activity.

7) High rates are observed on the scale of "Reactive Aggression" in 65% of subjects, which indicates the predominance of conflict in individuals of this subgroup. They have a high level of psychopathization, which is characterized by an aggressive attitude to the social environment and a pronounced tendency to dominance.

8) High scores on the scale "Shyness" were recorded in only 40% of subjects, low scores – in 15%. These indicators show that some people are characterized by self-doubt, awkwardness and timidity. During polygraph examination it may be associated with uncertainty and fear of being exposed, so such traits may be more common.

9) High indicators on the scale of "Openness" are observed in 35% of subjects, low – in 35%. These indicators show that only a few people seek to trust and open interaction with others with a high level of self-criticism. However, most are selective in their communication and cautious in making contacts. During polygraph examination, the need for defensive reactions increases, so the majority of respondents, especially those who lie, often show secrecy and isolation.

10) High indicators on the scale "Extraversion – introversion" were found in 40% of subjects, which indicate the expression of extroverted personality, low indicators – 10%, which indicate introverted personality.

11) High rates of emotional lability are observed in 35% of subjects, which indicates emotional instability, which manifests itself in frequent mood swings, irritability, lack of self-regulation, which often becomes an

emotional marker of hiding information or its falsity in communication with polygraph examiner, especially such reactions are indicative in conversations during polygraph testing.

12) High indicators on the scale "Femininity-masculinity" are observed in 35% of subjects, which indicate the course of mental activity by the male type, namely rationality, aggression and desire for results, focus on the task in his/her favor.

Thus, according to the indicators identified as a result of our study, it should be noted that all individuals have the highest score on the scale "Reactive Aggression". This indicates the predominance of conflict and dissatisfaction, which can be a protective personal strategy, which is manifested in the course of polygraph examination.

That is, most people in the subgroup, where there is the predominance of false information, have a high level of psychopathization, which is characterized by aggressive attitudes to the social environment and a strong tendency to dominance, as well as the predominance of emotional instability and tendency to affective response to avoid tension in conflict situations.

The results of the comparison of indicators in the two groups confirm the following (Fig. 3):

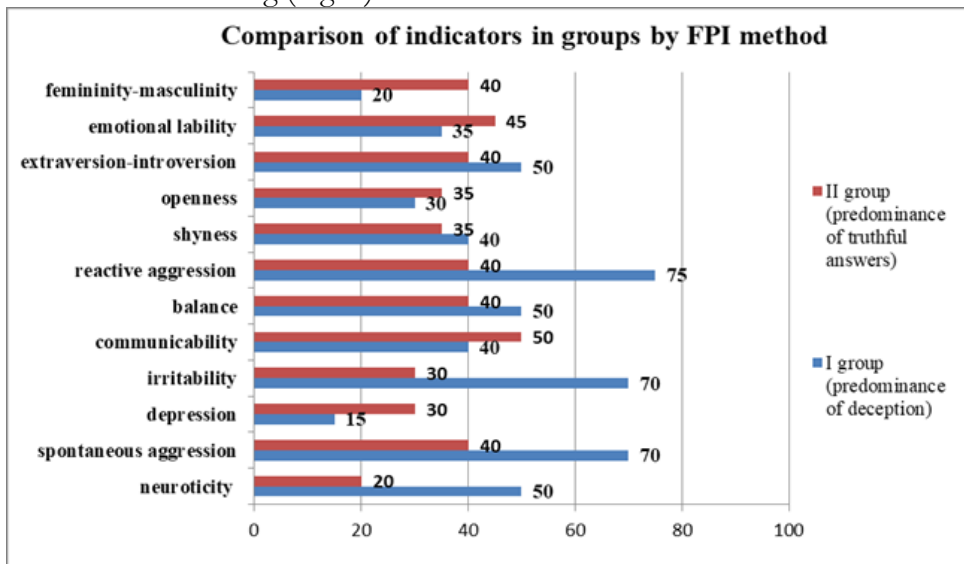


Fig.3. Comparison of indicators by FPI method

The first group, represented by individuals with a predominance of false answers, shows a significant manifestation of reactive aggression,

spontaneous aggression and irritability, which is undoubtedly an indicator of defensive emotional reactions in the case of polygraph testing and may be a manifestation of individual psychological characteristics of the emotional sphere and accordingly, by the manifestation of false answers.

In contrast to the first group in the second group, such qualities as femininity, openness and communicability are expressed, which characterizes the individual qualities of persons who found themselves in a situation of polygraph testing, as optimistic, sociable, involved in a situation without hostile and negative attitudes, which is undoubtedly explained by truthful answers and the lack of excessive tension associated with the testing situation.

Based on the results of the empirical study, a correlation galaxy was constructed, which reflects the direct and inverse relationships between the factors of the empirical research methodology (Fig. 4).

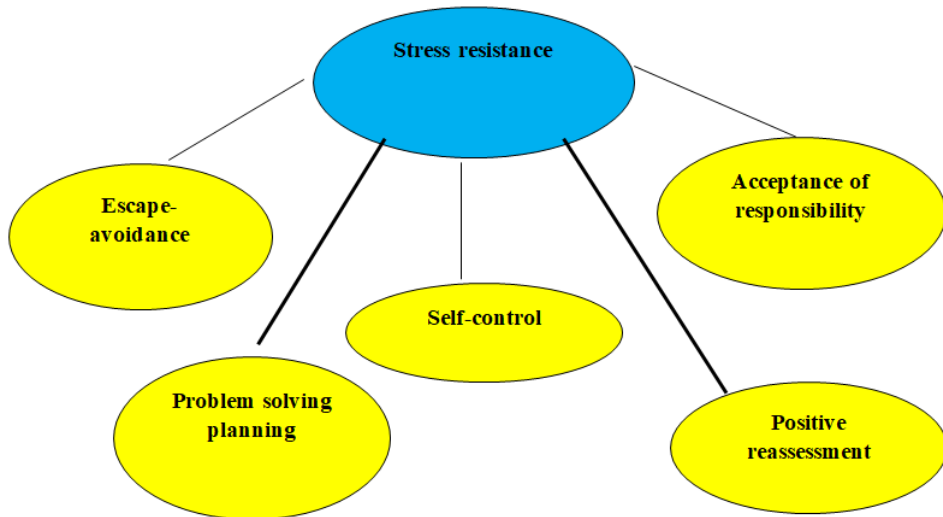


Fig.4. Correlation galaxy "Stress resistance"

Thus, stress resistance is characterized by direct correlations with the scales of methods "Acceptance of responsibility", "Escape-avoidance", "Self-control", "Problem solving planning", "Positive reassessment".

The following correlations were found. The "Problem solving planning" factor contains direct links with adaptive abilities ($r = 0.409395$).

The factor "Search for social support" contains a direct relationship with neuro-psychological stability ($r = 0.404712$). With the increase in search for social support the manifestation of neuro-mental stability increases.

The generalized results of correlations for the group under study are the dependence of stress resistance on self-control and factors of coping strategies. The growth of these indicators, respectively, affects the growth of stress resistance and resilience in situations of psycho-emotional stress, especially in connection with the situation of polygraph examination.

It should be noted that distancing reduces the manifestation of suicide risk and suspicion, that is, it acts as a certain characteristic that ensures the safety of the individual in unfavorable situations.

Social support also makes it possible to reduce selfishness and, accordingly, establish effective interpersonal relationships based on cooperation and mutual understanding.

With increased problem solving planning, the manifestation of stress resistance increases, and with increased positive reassessment, the manifestation of stress resistance in the group under study increases.

Since the situation of polygraph examination is undoubtedly stressful for each of the subjects, but it acquires a special emotional tension in people who seek to hide false information, so there are many personal, emotional and behavioral markers that clearly signal this desire and are reflected in the overall strategy of the organization of interaction, communication and behavior during polygraph examination.

Limits and Discussions

Prospects for further research are to study the characteristics of the fixed installation on polygraph research, because in the mental activity of the individual it acts as a mechanism for stabilization, stability and purposefulness of mental processes in changing situations and thus frees the subject from decision-making and control over situation.

Empirical research in the study of the impact of a fixed installation will be aimed at a comparative analysis of the two groups (one - with a view to the impossibility of deceiving the polygraph, and the other - on the contrary - setting the possibility of deceiving the polygraph).

Conclusions

Features of the manifestation of lies, its verification and detection are always associated with the experience of certain emotions in people who try to hide false information. The mechanisms for detecting true and false responses are determined using a computer polygraph, which is responsible for instrumental lie detection and assists in recording physiological responses to verbal and nonverbal stimuli.

In a computerized polygraph test, the person being tested assesses the risks in order to conceal false information. The success of this assessment by a polygraph examiner is reflected in the ability to assess the picture of psychophysiological reactions in the process of answering questions, as well as analysis of a set of emotional, behavioral and individual personality characteristics that may indicate concealment of false information.

Instrumental detection during polygraph testing should aim to obtain information, avoiding ambiguity, doubt, assumptions, and subjective association with an adequate reflection of reality. Undoubtedly, there is information that characterizes certain actions performed by a person, which he/she interprets and submits in the form of a true or false answer to a question evaluated by a polygraph examiner.

Also, the effectiveness of the methods of verification and detection of lies depends on the qualification level of the specialist, individual approach to each test, taking into account the details of the event, psychophysiological features of the person, which include not only the type of nervous system but also external and internal factors that influence the results.

The conducted empirical research made it possible to describe the characteristics of persons who underwent polygraph examination and showed false answers to polygraph questions and accordingly showed certain emotional reactions (irritability, aggression (spontaneous and reactive)), personal (adaptability, stress resistance, etc.) and behavioral characteristics which testified to false information.

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