Development of the Semantic Organization of Memory in the Age Group Over 65

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Abstract

Today's perceptions of the 65-year-old age group are subject to critical analysis, as for people whose cognitive abilities are severely limited due to (allegedly) age-related changes in the CNS.

The argument is supported that the main cause of memory problems in this age group is not due to irreversible physiological changes but rather to socio-psychological and volitional factors that are related to the reduction (often involuntary) of people's work activity.

A set of socio-psychological measures related to the application of the group models, the model of the comparative semantic signs, the network models and in particular the model of the propositional networks for the improvement of the semantic organization of memory in the age group over 65 years is considered.

The system approach for delaying ageing processes, called by the author, „Wisdom of Generations", is of paramount importance. The essence of the approach and the possibility to apply it in the conditions of Bulgaria is critically analysed.

The essence of the approach is to stimulate different connections between the accumulated knowledge and skills and the contemporary needs of society. Particular attention is paid to the search for and finding appropriate approaches to generate non-standard solutions to the emerging problems in the contemporary world, both at the level of the individual and the solving of the existing problems of the society. An analysis of those social and economic conditions that would allow the implementation of the project in the conditions of Bulgaria is present.

Keywords: Ageing, Semantic approach, Memory, Retardation of cognitive development, Socio-psychological factors of ageing.

Introduction

One of the attributes attributed to people of the third age (we consider this term to be the most neutral and not "damaging" to the image of the age category of people over 65) is the initial weakening and subsequent memory disturbances.

Along with this, it is obvious that this indicator cannot be defined as a mass phenomenon that affects all people, as is the case with the reduction of motor capacity or cardiovascular function. Numerous are examples in which people in the 70s and 80s retain clear memories of both events that occurred many years ago and of events that took place just before the need for memory to "provide" the necessary information.

From this it can be concluded that the differences in the possibilities of memory are to a considerable extent due to the individual-personality differences and, in particular, the organization of the information to be remembered.

Existing research in the field of gerontology shows that memory is preserved in those individuals who not only use the acquired knowledge and experience but also organize this knowledge and experience in a certain way.

In most cases, at least in our country's practice, such an organization is based on previous experience, as well as taking into account those circumstances (including the creation of relevant social conditions) that accompany the advancement of age.

According to our research in this area (some of the data will be listed below), there is an opportunity to learn models and systems that allow the organization of memory to

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be a "reliable friend" of the third-age people and to enable them to participate fully in the social life of society.

Practices in this field are used both in well-established approaches to cognitive psychology and adapted cultural models that enable older people to pass on their accumulated experience and knowledge to new generations actively involved in economic and social processes [13].

Semantic organization of memory and preservation of the possibilities for representation of information in the elderly

Data from multiple memory studies in third-age people suggest that the reduction in perceptual possibilities can be fully compensated by the development of the semantic organization of memory. This also shows G. Bauer's experiments as well as later research in this area. Even in the case of physiological disorders, memory can function fully adequately if the corresponding patterns of organization of individual units of thought are applied. This suggests that in finding an adequate model of organization of information elements, man's memory will be as "helpful" as it is to younger people. The task in this case is to set such criteria for the organization of the information units, which allow the grouping of the information and the realization of the reproduction mechanism under different conditions.

Consideration should also be given to the fact that the level of memory of adult influence is not only "internal psychological" but also a number of social factors. They should be taken into account to a not lesser extent.

In particular, these are the differences in the level of knowledge, including the fundamental ones, and the focus on certain developmental trends that are specific to each generation.

In most people of the third age, these are the main reasons for the loss of "semantic orientation" in the conditions in which the next generations dominate [14].

An important element is also the attitude of others who, although implicitly demonstrating a relationship implying a "sparing" working regime for the third-age people. Although this is done in their "interest", such an attitude creates an attitude that memory is unable to meet the need for the full activity of these people.

Frequently the question also arises, and should action be taken that will lead to the full work of people over the age of 65?

The answer given by research in gerontology is unequivocal - yes, efforts should be made in this direction. The reason for this is not only the opportunity for this age category to participate fully in work but also the need to pass on the experience of the younger generations as well as to seek new approaches to resolving the existing problems.

Models of semantic organization of memory in persons over 65 years of age

In the practice of cognitive psychology there are numerous techniques for the semantic organization of memory.

However, we have set ourselves the goal of separating among these techniques such which, by their very nature, would be best suited to the semantic organization, namely in the age category mentioned. The opinion is based on a survey (its details will be outlined below) as well as the subjective perception of the methodologies from different education, main activity and place of residence of people of the specified age category [15].

It should also be noted that the performance of the techniques is similar in both genders.

(a) Theoretically-multiple model of semantic organization of memory;

This model implies that semantic concepts are presented in the form of groups of elements or information arrays.

Unlike other models (e.g., clusters), a particular word or concept can be represented not only by the patterns of such a concept, but also by its attributive characteristics.

Practice shows that it is this model that makes it possible to use in a maximum volume the complex of concepts that are accumulated in the memory of the elderly but cannot be duly linked to the systems and structures of the surrounding reality. The theoretical-multiple model takes into account two basic types of logical relationships:

1. The general statement

2. The private statement

The general statement implies a case where all members of a certain category belong to another category.

The private statement assumes that only part of a certain category belongs to another. This feature of the model enables older people to identify the similarities and differences between new objects with that amount of information they have, and to group new objects that are unknown to them by signs of familiar ones. The exercises that correspond to this method can vary in greater extent and the moderator can form them relatively easily, drawing on the peculiarities of the previous experience of the people involved in a particular group. Implementation of the model can take a group form, so it can also be done on the basis of individual activities.

One of the variants of the theoretic-multiple model is the model of comparative semantic signs. Although the two models have similar elements, there are still some differences between them.

The first difference is that the meaning of a particular word is not considered as a single meaning unit. Each word is rather a set of certain semantic signs which, under certain conditions, can be the basis for changing the meaning, and the change may be in a very wide range.

The next difference is that each lexical unit can be represented by a set of signs that could be grouped into two main categories:

1. Defining signs that give the basic meaning of the lexical unit concerned and as a rule represent a systemic set of properties;

2. Characteristic features that define the lexical unit in specific, characteristic aspects of its use.

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The use of the model of comparative semantic signs in dealing with third-age individuals makes it possible to build up direct causal links between the information available to this category of people and those new elements of reality that are hard to understand for them.

The application of both the theoretical-multiple model and the model of comparative semantic features can be applied both together and separately depending on what audience is being handled in the specific case.

(b) Network patterns of memory organization;

One of the first network models of the memory organization was developed by A. Collins and R. Quiliman in the late 1960s. In this model of a semantic organization of memory, each lexical unit is placed in a system configuration of other lexical units and causal links are established between them. The relations between these lexical units and the interrelationships between them are established.

The Collins & Quillian model suggests that semantic memory consists of a vast network of concepts that are composed of units and properties and are associated with a number of associative relationships. Despite a number of criticisms of this model, it provides a good basis for seeking new models of associative memory.

Of particular importance for working with this age group are two models:

1. The human associative memory (HAM) – model of human associative memory;

In order to find a connection between everyday problems and the representation of knowledge, certain statements are used - allegations or statements about the essence of the surrounding reality.

Proposition is an abstraction, something like a separate structure that links ideas and concepts. Most often, in real classes, the propositions are illustrated with specific semantic examples.

2. The adaptive control of thought (ACT) model;

The model implies that external stimuli are coded in the work memory and systematically interact with the experience gained. Output information takes the form of different actions. During its operation in the memory system, the information passes through three types of memory. There are three types of memory in the system memory structure - working, declarative, and productive.

Operative memory is the one to which the individual can access at that particular time. This is an active memory. Declarative memory includes the knowledge of the world that has accumulated the individual through its life. This type of memory includes episodic and semantic information. The declarative representation falls into the system in the form of blocks arranged in a certain sequence. The new information, which is synthesized from the main elements, is stored in the declarative memory through the working memory.

Productive memory is very close to procedural knowledge, which is a necessary element for the implementation of certain actions that determine the daily needs of the person.

The difference between procedural and declarative knowledge is analogous to the difference between how a certain result should be achieved and what result is expected.

(c) Neurocognitive patterns of memory organization;

In recent decades, gerontology and cognitive psychology have increasingly begun to focus on neurocognitive models.

The neurocognitive approach as a whole implies the study of various problems including memory problems through the specific features of neuronal activity, the cognitive behaviour of man in the process of his life. The neurocognitive model is built on two basic principles.

The first principle is the principle of neuroplasticity, which assumes that the principle of biology and medicine is adopted, that brain neurons are adapted by the experience, as well as internal and external factors.

The second principle is the principle of evolution, according to which neuroplasticity is seen as a result of the adaptation of man to the peculiarities of the environment. Furthermore, this adaptation allows mental activity to be organized in the most optimal way for the specific conditions [16].

Methods based on neurocognitive models are related to the use of hypertext elements that mask third-age individuals. Hypertext skills are related to building images based on the minimum amount of lexical units to use in this process. Practice shows that such methods are perceived positively by individuals because they are also related to computer literacy training.

One of the key approaches to digital technology is the development of so-called transact memory. It is a phenomenon where people rely on the memories of their relatives and relatives, building the logic algorithm to reach a certain genre and type of information. In the use of exercises with elderly people, the models used in B. Sparrow's experiments were used [17].

In the course of exercises related to the use of neurocognitive models, the application of different approaches based on voice-responsive systems is also essential [18].

Generally, the use of neurocognitive models depends on the peculiarities of the group or the individual features of those who have expressed a desire to develop memory. Individual components of neurocognitive methods are also used in the application of other models.

"Wisdom of the Generations" Project

According to the author, the use of methods for the development of semantic memory and the slowing down of ageing processes within the authorial project "Wisdom of Generations" is the most appropriate.

Within this project, not only the implementation of occupations with the category of third-age people, but also the active use of their potential in decision-making in the field of management or technical sphere.

The main purpose of the author project is to make the most of the existing experience with the mentioned group of people and

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it is applied on a systematic basis to the current issues. This is another crucial task - building continuity in finding positive and productive solutions and avoiding those shortcomings that have had a place in the past.

The "Wisdom of Generations" project includes several separate elements that solve (according to the empirical study conducted specifically) the two tasks. The project elements are applied in a progressive manner, and each participant may wish to leave the project at any point in time. The individual elements are as follows:

(a) Diagnostic element

Within this element, a common diagnosis of the memory status of the participants is carried out, using both psychological and medical-biological approaches.

A classification of the memory status of each participant is made on the basis of the creation of average coefficients that are created according to the following criteria:

1   Using the memory information arrays;

2   The ability to perceive and incorporate new information into the information arrays;

3.   And the use of information arrays to solve specific or abstract tasks.

(b) Training the participants of new models of semantic organization of memory;

In this element there is a series of consecutive training, where individuals master the theoretical-multiple models, network models and neurocognitive models to develop semantic memory.

Progressive mastery can take place both in group form and individually, depending on the specific state of the participants' memory.

It should be emphasized that when conducting group activities, participants are selected for similarity to memory status, level of intelligence, and program direction.

In the individual form, the control of the individual elements depends entirely on the desire of the participant himself.

As a rule, the specific practical elements of the training are selected on the basis of the participants' desire, as the moderators of the exercises are assisted in specific areas by the respective specialists [19].

(c) Diagnostics element of problem areas;

This element examines those problem areas that exist in front of the individual or a particular group (when conducting group activities). These may be problems related to psychological conditions or socio-psychological problems, as well as those related to the reduction of the creative capacity of the personality.

The diagnosis of problem areas determines to what extent their occurrence is related to reduced memory capacity and in what area they are related to the peculiarities of life situations. Problem areas may be in the professional sphere of other professionals, for which the participants are informed in good time.

Systemic identification of problematic areas, as well as the systemic nature of their solution, are also important.

Identifying problems requires a clear distinction between objective laws and emotional components. This type of identification also requires active use of memory as this element is worked out in the process of dealing with people of the third age.

One of the most important elements in the identification of problematic areas is the identification of social problems of the age category over 65 years.

From the research done, as well as from other data, it follows that intellectual difficulties are more a product of social expectations than objective difficulties of a somatic or psychological nature. That is why at the stage of identifying the problems, the cultural, social and objective problems of the individual or even of a whole social group should be separated. The task can be considered to be achieved when specific people begin to adopt their age and see not only the constraints imposed by it but also the existing opportunities that would be realized by them. In this sense, it is important to apply the creative possibilities to the social and, in particular, the family relationships of the persons of this age group.

(d) Using the creative potential of people in the third age;

One of the most important and effective elements of the Generation Wisdom project is the creation of a methodology for the utilization of the creative potential of the elderly.

The practice of applying the methodologies shows that the existing belief that after the cessation of active labour activity there is a decrease in creativity is untrue. Moreover, when creating the necessary psychological conditions, these people have serious creative opportunities both in their previous work activity and in areas that have been distant from their activities in earlier years.

The use of creative capabilities is based on two interrelated elements:

1 Using the accumulated professional and life experience as this experience gets the necessary "algorithmization" and systematization.

Practice and relevant empirical research have shown that experience has made it much easier to find non-standard solutions for a number of tasks. Obviously the reason for this is the presence of a significant amount of information about system links for objects and processes that have different "species" and "generic" accessories. In this case it can be argued that the life experience, the knowledge about the manifestations of the systemic relations in their development, is of prime importance.

Provided that people perceive principled models of comparison of these links, they are given the opportunity to create algorithms applicable in their specific practice. The basic element that can and should be perceived by people is the construction of a network system that has harmonic characteristics that can be applied to different life situations. This is what allows the application of the individual methods described above in this article;

1 The use of the projective possibilities to solve different creative tasks;

Various elements of combinatorics, and in particular the

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four basic rules of combinatorics, apply to the use of design possibilities, namely:

2   The amount rule;

3   The rule of combinations without and with repeats;

4.   the rule of distributions without and with repeats;

5.   and the displacement rule with and without reps.

Of course, other approaches can also be used at the request of the participants and, if necessary, to solve significantly more complicated tasks. Particularly interesting is the manifestation of projective opportunities in areas that were not the subject of human activity in earlier periods.

For example, the engineering capabilities of engineers can be actively used in the arts as well as in the conduct of a different organizational activity. Indeed, design capabilities have been applied long enough to model social processes and design different engineering models. However, the projective methods have so far not been applied to the needs of gerontology and work with the third-age people [20].

An empirical study on the effectiveness of methods for the semantic organization of memory for persons over 65 years of age.

An empirical study was carried out to empirically test the effectiveness of applying semantic memory organization methods to persons over 65 years of age, whose purpose was to examine the hypothesis of improving the memory of the mentioned group and to preserve the creative possibilities of these persons.

In the study, a sample of 300 people of both sexes was formed at the distribution indicated in (Table 1).

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Table 1: Distribution of the sample by sex and age

	65-70 years	71-76 years	76-81 years
men	50	50	50
women	50	50	50

The sample is formed by four cities in Bulgaria, two of which are large cities - Sofia and Plovdiv, and the other two cities can be referred to the smaller towns of the country - Yambol and Haskovo. Each city has 75 respondents. All persons included in the sample have undergone semantic memory organizing courses at Day Care Centres at the Social Care Directorate in their respective cities. A control group of similar size has been formed, with identical gender and age distributions, and respondents from the control group have also been recruited from the respective cities of the country but have not undergone the relevant semantic organization of memory.

The aim of the study is to establish to what extent the training procedures for the organization of the semantic memory have a positive effect on the measurable results of the intellectual activity of the experimental group compared to the control one.

An important element of the study is also the verification of how the improvement in the organization of memory has an impact on higher intellectual processes, in particular on the level of creativity.

The results shown by the respondents in the sample are broken down by individual indicators as follows:

(a) Overall level of memory improvement

The data from the general improvement of the memory level is presented in (Figure 1).

As can be assumed, the information shedding has at least a relative increase since it is to a great extent dependent on the physiological characteristics of the receptors. However, in this respect, the increase compared to the control group is significant. The highest data is in the system of information, which is important for the state of the thinking creativity and the finding of non-standard solutions.

(b) Improving the use of information in decision making.

(Figure 2) shows the percent improvement from the use of the information contained in the memory as well as the accumulated experience of the experimental group compared to the control group.
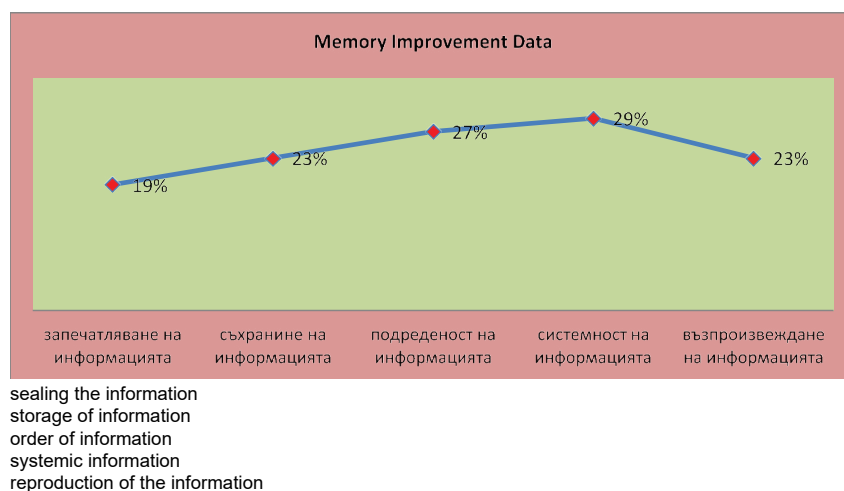

Figure 1: Overall improvement of the experimental memory level compared to the control group. These percentages are positive and are relative to those of the control group.

The figure shows the main elements of using the information that reveals the best results.

Percentage improvement of the information used by the respondents in the experimental group compared to the control group.

As can be seen from the chart, the most significant improvements in the process of using information are observed using the life experience in the memory of a person. It is the experience of life that enables us to identify the systemic connections between the processes and the facts of the surrounding environment and, on that basis, to draw the relevant practical conclusions.

Almost equally important is the professional experience of the person, as it reveals significant opportunities for the transfer of the so-called "unsystematized" professional experience. It is on the basis of the use of life and professional experience that the high indicators in the identification of problematic areas, the creation of algorithms for solution and practical application of these solutions are also found.

The data recorded for the last three elements is lower than the use of life and work experience, but this can be taken for granted quite naturally due to relatively less experience in this area (in practice experience is initially limited to work in the group).

(c) Improving the creative potential of the representatives of the experimental group.

Improving the creative potential of the third age people is a natural result of the development of the semantic organization of memory in this category.

(Figure 3) presents the data that takes into account the improvement of this element of psychic processes.

As can be seen from the figure, the most significant positive changes are observed in the increase of responders'

combinatorial level. Also considerably higher than the level before the relevant sessions is the level of systemic solutions they take in both standard and non-standard situations. Even if data (which are not representative in nature) are not fully confirmed in other social groups and other regions of the country, it can be concluded that the myth of limited creative capacities of the elderly is "distracted."

Although people in the same age category participated in the control group, it should be noted that the level of creativity of the elderly is not much lower than the younger generations.

(d) Semantic organization of memory and level of social adequacy of the third-age people.

As we pointed out at the beginning of this article, one of the major problems of the elderly is the process of de-socialization, which results from the dominant attitudes towards a certain age category.

Within the empirical study, one of the questions to be answered was how the development of the semantic organization influenced the social adaptability of people in this age category.

The main elements of improving social adaptability are presented in (Figure 4).

It is highly anticipated that the improvement of cognitive functions due to the better semantic organization of the memory of the elderly will affect the adequacy of perceiving social contacts and increasing the degree of emotional sustainability in their realization. Obviously the reason for this is the fact that social patrons are beginning to lose their impact on the representatives of the age group, and the overall effectiveness of their action has a direct impact on how they are perceived by others.

Of course, in this case, positive changes have a lesser percentage. Probably the reason for this is the stability of established social models.
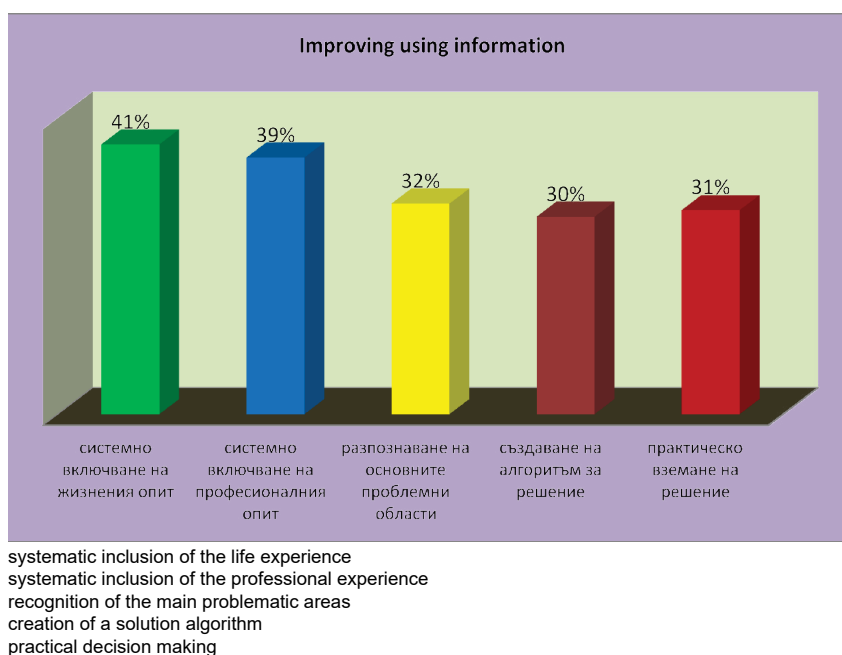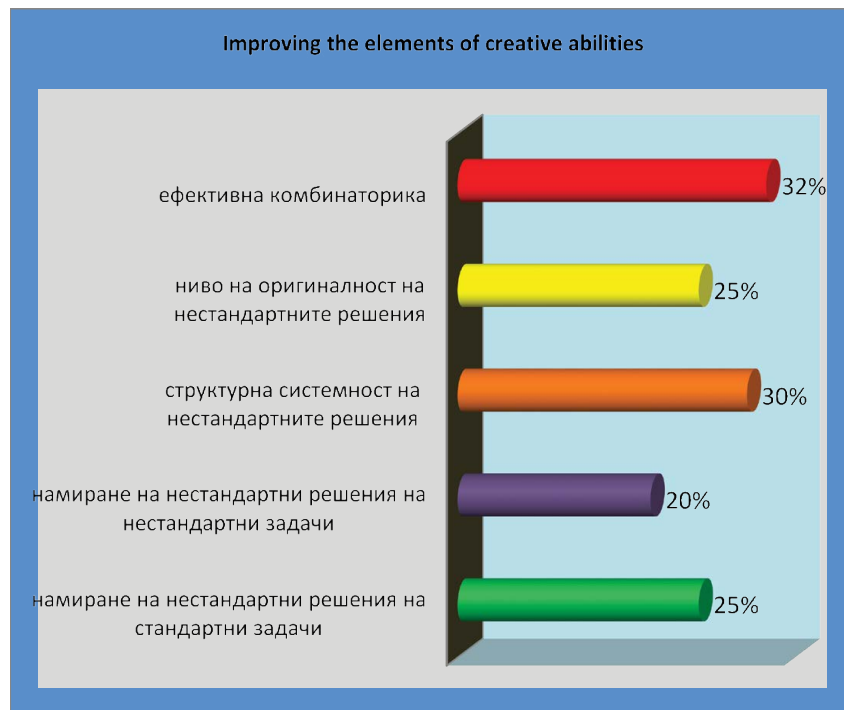

systematic inclusion of the life experience
systematic inclusion of the professional experience
recognition of the main problematic areas
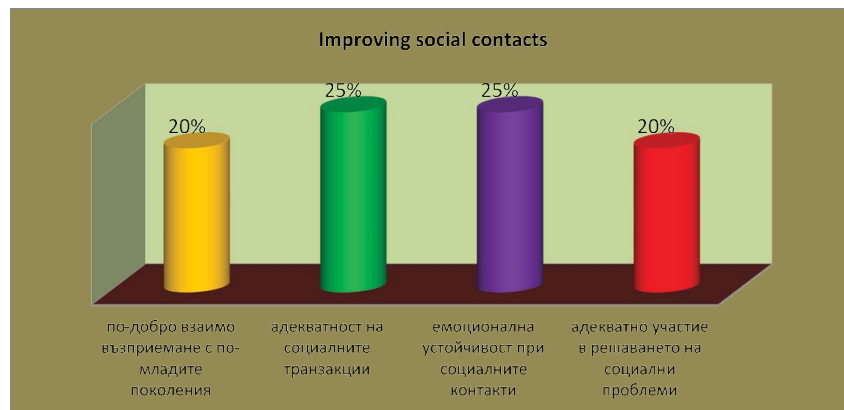creation of a solution algorithm
practical decision making

Figure 2: Percentage improvement of the information used by the respondents in the experimental group compared to the control group.

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effective combinatorics
level of originality of off-beat solutions
structural system of off-beat solutions
finding off-beat solutions for off-beat tasks
finding off-beat solutions for standard tasks

Figure 3: Improving the individual elements of creativity as a result of improved semantic organization of memory. The difference between experimental and control groups is shown in positive percentages.

better mutual acknowledgement with younger generations
social transactions adequacy
emotional sustainability of social contacts
adequate participation in the social problems solution

Figure 4: Improving the social interactions of the respondents in the experimental group compared to the control group. A positive percentage improvement has been reported.

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