Splitting the Cognitive Style Field-Dependence / Field-Independence and Speed of Memorizing the Nonverbal Nonsense Material

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ABSTRACT

The article presents experimental research of study of relationship between cognitive style of field dependence / field independence and of memorizing speed of nonverbal memory nonsense material. Research aim of this study was to investigate the effectiveness and qualitative uniqueness of mnemonic abilities of field dependence and field independence subjects in condition of cleavage the cognitive style. Mobile field independence subjects demonstrated high optimal results in memorizing speed of nonverbal memory nonsense material, while representatives of fixed field dependence style were represented minimal results.

**Keywords:** Field dependence, field independence, mnemonic abilities.

1. INTRODUCTION

The study of individual identity of cognitive manifestations has led to the need to analyze the place and role of perceptual styles in the structure of cognitive abilities in general and mnemonic abilities in particular [3, 11, 13].

The cognitive styles are generally understood as relatively stable methods of cognitive activity or cognitive strategies, consisting in the peculiar methods of obtaining and processing information, as well as receptions of reproduction and its control methods [5, p. 307].


Significant contribution to the study of cognitive style in domestic science is developed by: V. A. Kolga, E. T. Sokolov, V. N. Dunchev, A. I. Palei, A. E . Druzhin, I. V. Ravich - Scherbo, I. W. Tikhomirova, L. P. Urvantsev, I. P. Shkuratov, M. S. Egorova, V. V. Selivanov, M. A. Holodnaja, etc. [14, 15]. The stylistic parameter of field-dependence / field-independence was described by G. Witkin in connection with investigations of individual differences in human spatial orientation [14, 15].

Later Witkin found it possible to define the cognitive style as "structuring ability in perception." Consequently, the field dependence - field independence, is expressed by him as general property of perception and does not refer to its individual modalities.

In studies of domestic and foreign scientists the duration of field independence turned out to be associated with successful implementation of various types of intellectual activity.
The studies of D. Goodenough, S. Karp, H. Moss and V. Selivanov revealed the significant relationships between field dependence - field independence and subtests in Wechsler IQ test [2].

Field independence correlates with high spatial abilities (Vernon, McLeod, Jackson, Palmer), with success of completing the Raven test (Widiger, Knudson, Rover), with developing the formal thinking by Piaget (Neimark, Noppe), as well as with high level of creativity (Noppe, Dunchev, Paley.) [2].

The field independence correlates with memory efficiency (Devis, Frank), ability to transfer a knowledge (Frank), high levels of educational activity (Satterly, Abakumova, Shkuratova, Tihomirov) [8, 12], success learning in technical professions (skills) (A. E Druzhinin, Sergeev) [1, 10].

Lately the theoretical information and empirical data of researches on the effectiveness of various kinds of activity representatives’ stylistic poles entered into an obvious contradiction. In this case the experimental data became impossible to be explaining within a meaningful position. M. A. Holodnaja has been analyzed and identified the contradictions of G. Witkin, T. Globerson, M. Nayes, D. Kanningeim, S. Ridley and A. Campbell, and moved from the traditional understanding of cognitive style as the bipolar dimension to understanding it as the square-polar measurement. The pole of field dependence is split into fixed field dependence and mobile field dependence, the pole of field independence is split into fixed field independence and mobile field independence [1, 10].

M. A. Holodnaja noted following important conclusions of this study by summarizing all the facts about the "splitting" of the poles of the cognitive style: Firstly, the "peak" of field independence manifestations comes on teen and early adolescence age, than it is reduced at older ages. Secondly, Witkin described that field independence people are more creative generally, especially for field independence flexible and mobile groups. Much later, this assumption has found empirical support (D. Kanningeim, S. Ridley, A. Campbell, Noppe). Thirdly, the effect of mobility (shift) of stylistic behavior is observed only into feel independence people who are sufficiently easily removing, if necessary, into the functioning field dependence mode, (Witkin, Oltman, Raskin, Karp, Witkin, Goodenough, Oltman) [10].

According to studies, the highest intellectual productivity is observed by representatives of mobile field independence cognitive style. In particular, mobile field independence people have higher educational achievement from tests in biology, mathematics and chemistry (Niaz), more productive in terms of working memory and mental stress (Globerson). D. Kanningeim, S. Ridley and A. Campbell found in own research, that mobile field independence people showed a higher success in the interpretation of the content of proverbs, while the lowest index was noted by fixed field dependence subjects. M. A. Holodnaja made research on a sample of students 20-22 years old, consisting of 45 people by the following procedures: "Included figures" of G. Witkin, "Word - colored interference" of J. Stroop, "Progressive matrix" of J. Raven, "Ways to use an object" of J. Guildford, "Ideal conceptual structures" and "conceptual synthesis" of M. A. Holodnaja. Mobile field independence subjects are more effectively dealing with the conflict of verbal - spoken and sensory - perceptual functions when performing the Stroop procedure, they have more differentiated participation process of sensually-sensory experiences during analyzing...
the content of the concepts. They have higher indicators in formation of conceptual structures and higher possibilities in categorical regulation of working-out information processes. M. A. Holodnaja concluded that: "... in the mobile field independence subjects there is some mechanism of involuntary regulation of intellectual activity ... associated with the connection of controlled metacognitive structures of their mental experience " [10].

G. Witkin and his followers (Goodenough, Oltman) according to introduced their concept of "mobility", are pay attention to the fact that representatives of one cognitive style can develop qualities that are typical for representatives of other cognitive style [14, 15].

I. G. Skotnikova obtained data on increasing field dependence from research in terms of the gravitational effects. L. P. Urvantcev and N. I. Kurochkin founded that field independence increases in the conditions necessary for successful professional activity [6, 9]. So for example good radiologists have noticed high scores on field dependence / field independence. V. V. Selivanov showed changes of cognitive style: 67% of the subjects became more field dependence after persistent feelings of failure activity and a significant reduction in self-esteem. Field independence increased more than twice in 56 % of researched group. Both polar poles, as field dependence and field independence, are available to everyone. Each, in his opinion, may exhibit field dependence activity in one area, and field independence activity in another. V. V. Selivanov argues that cognitive styles cannot be rigid, stable and unchanged structures, since they are most evident in the initial moments of thinking process. According to him, it is "the achievement of mobility and the subject of training and education in line with cognitive functioning" [7].

In our understanding the cognitive styles are the relatively stable characteristics of a person as the subject of cognitive activity and surely make influence to the quality and originality of the effectiveness of cognitive processes, while they do not become as abilities. There should be a clear distinction between cognitive abilities and styles. Abilities are become the instruments of mental activity. They do "absorb" cognitive styles as a symptom of the subject-stable (relatively stable) characteristics, manifested independently of consciousness. In other words, the cognitive styles are addressed to the basic human preferences characterizing the qualitative uniqueness of cognitive activity. We believe that the cognitive styles define the qualitative uniqueness of the cognitive abilities’ operating and regulatory sides [11].

Mnemonic abilities, as the resources of mnemonic activity, determine not only the qualitative uniqueness, but also the effectiveness of any mnemonic result. Meanwhile, the memorized information passes specific treatment on the level of perception, differently speaking, cognitive – stylistic originality can appear in the results of memorizing and recognition. Mnemonic abilities become implemented by system of functional, operational, and regulation mechanisms. Functional mechanisms of mnemonic abilities - is due to genotypic and congenitally caused properties of functional systems of the brain to encode and decode information, that has individual measure of the severity of the individual, and is manifested in the efficiency of the processes like capturing and storing, preservation and reproduction.

Specificity of the operational mechanisms, as the methods of processing memorized material, is not incorporated genotypic ally. Operational mechanisms are the actions that can have perceptual, mnemonic, intellectual and speech - motoric origin.
While human cognitive styles, as well as other methods of organizing information, are working as components of the operating mechanisms of mnemonic abilities. Development of the structure of the operational mechanism occurs in two ways: first, in the direction of increasing the number of mnemonic actions, then in the direction of complexity and transformation the relations between mnemonic actions.

Including the context that operational mechanisms are the main condition for the unfolding of the mental mnemonic space, and that cognitive styles are the components of this space, coming in representatively-cognitive structure of all intellectual abilities – there is becoming the manifestation of cognitive style of cognitive activity during unfolding mental mnemonic space.

It seems reasonable to assume that most predominant cognitive style of the subject should be manifested in the process of unfolding mental mnemonic space [3, 4, 11, 13]. In accordance with the concept of mnemonic abilities following types of memory and playback were investigated:

1. Perceptual - mnemonic. This type is characterized by perceptual processing of memorized material. Human is trying to memorize the information in the form of which it is presented.
2. Figuratively - mnemonic. This type is characterized by the presence of memorized information processing at the level of ideas, imagination and memory.
3. Intellectually - mnemonic. This type is characterized by the dominance of mental processing. The human is able to working out the material at different levels of cognitive activity, where thinking process performs a regulation function [11].

The development of mnemonic skills is presented by itself the development of system of functional, operational, and regulation mechanisms. In first developmental level of mnemonic abilities the memorization is committed to building on the functional mechanisms, where operation mechanisms have not yet appeared. There is become perceptual processing material, which is usually weakly regulated process. It holds external regulation by motivational sphere of human, which is expressed in the desire to remember, to focus, and being attentive. The memorizing process at that level is close to the capturing (imprinting), which means that information is circulated, repeated, but not yet processed or transformed.

The operational mechanisms are coming at the second level. At the beginning it is usually presented as measured actions. The memorizing process at this level is fundamentally changing. Subject becomes purposefully and meaningfully navigated in memorized material.

Third level is characterized by the appearance of regulation mechanisms and mnemonic activity, as a consequence of that.

The fourth level is characterized by systemic interactions of functional, operational, and regulation mechanisms. The subject may be varied in the choosing of resources of working out the memorized material. The thinking process is dominating in this case.
At this level of mnemonic abilities development the control over memorization is indissoluble unity with the memorizing process [11].

2. METHODOLOGY

Research goal: studying the speed of memorizing meaningless nonverbal material in the condition of cleavage the cognitive style field dependence / field independence.

Hypothesis: mobile field independence subjects are memorizing meaningless nonverbal material more quickly, than mobile and fixed field dependence subjects, also fixed field independence subjects.

Research methodology: To study the relationship of cognitive style and the productivity of mnemonic abilities we chose following methods: test "included figures" of G. Witkin and method of deployment the mnemonic activity of L. V. Cheremoshkina [11,13].

Method of G. Witkin consist two parts, A and B, each consisted of 12 complex figures. The main indicator of field dependence / field independence is the time of finding a simple figure in a complex figure. Additional indicator is the coefficient of implicit learning, which is defined as the difference of runtime of 12 tasks from first half (part A) and of 12 tasks from second half (part B), divided by runtime of 12 tasks from first half (part A). The higher value of this index, the faster time is for subject who finds a simple shape in a complex figure and completes the second half of method, in comparison to the implementation (speed-time) of its first half. Accordingly, the lower value of this index, the slower time is for subject who finds a simple figure in a complex figure at the second part of method.

Method of expand (deployment) of mnemonic activity of L. V. Cheremoshkina was used to assess the manifestations of mnemonic abilities [11]. It is aimed for studying the effectiveness of memory, its developmental level, as well as the qualitative uniqueness of mnemonic techniques and methods of their regulation. The deployment method of mnemonic activity is carried out using 10 cards with images on them figures of increasing complexity, which consist of straight lines intersecting.

Time of presentation for each card is following: from the 1st to the 10th of presentation – 1 second, from the 11th to the 20th – 2 seconds, from 21st to 30th – 3 seconds, etc. Nonverbal meaningless material and the order of its presentation, presented above, allow us to "expand" the mnemonic activity and isolate productivity implementing its mechanisms: functional, operational and regulation.

In this research, 3 indicators were estimated by using the method of deployment mnemonic activity:

1) productivity of memorizing relying on operational mechanisms by using the card number 2.
2) efficiency of memorizing due to functional and operational mechanisms by using the card number 3.
3) level of the development of mnemonic abilities.
To obtain more information there was used questionnaire with 30 questions, provided diagnostic procedure of mnemonic abilities [11]. Poll test after memorizing different complexity of the material allows to draw conclusions about:
- the presence or absence of mnemonic techniques;
- its quantity and variety;
- the speed of incorporation of mnemonic techniques in the memorizing process;
- the development level of regulation mechanisms of mnemonic abilities.

The developmental level of mnemonic abilities was determined by the analysis of speed memorizing for simple and complicated material, also by the questionnaire. Data was obtained from 40 subjects (20 for males and females) aged 17-18, as students of Moscow State Regional Institute for the Humanities.

3. RESULTS AND DISCUSSION

Table 1. Results within cleavage (splitting) of the cognitive style field dependence / field independence (Witkin technique).

<table>
<thead>
<tr>
<th>Cognitive style</th>
<th>% of subject (frequency)</th>
<th>Time of finding easy figure in complicated figure, in seconds</th>
<th>Coefficient of implicit learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>mobile field dependence</td>
<td>2.5 %</td>
<td>60</td>
<td>0.2</td>
</tr>
<tr>
<td>fixed field dependence</td>
<td>32.5 %</td>
<td>62</td>
<td>-0.11</td>
</tr>
<tr>
<td>mobile field independence</td>
<td>57.5 %</td>
<td>16</td>
<td>0.5</td>
</tr>
<tr>
<td>fixed field independence</td>
<td>7.5 %</td>
<td>17</td>
<td>-0.45</td>
</tr>
</tbody>
</table>

From 4 groups, determined by G. Witkin technique (table 1), the largest group in our sample is represented by mobile field independence (57.5%). Representatives of this group shows the minimum time for finding a simple figure in the complex figure, in time of 16 seconds, and the high coefficient of implicit learning - 0.5. These results suggests that mobile field independence subjects are completing the tasks much faster also in the second part of the procedure (form B), they are finding simple figure in the complex figure much quicker than in the first part of the method (form A).

The second group by frequency is consisted of fixed field dependence subjects - (32.5%). They found simple figure in the complex figure at maximum time – level, from all 4 groups, it is 62 seconds. Coefficient of implicit learning in this group is negative (-0.11). Therefore fixed field subjects are recognizing the simple figure in form B much slower, then during the completing of form A.

The frequency of third group, of fixed field independence subjects, is 7.5 %. Time for finding the simple figure is 17 seconds. However, the coefficient of implicit learning in this group is the lowest of the studied sample, and has a negative value (-0.45).

The fourth group is the smallest (2.5%), presented by mobile field dependence subjects, which do recognize simple figure in complicated figure in 60 seconds. But second part
of that method (part B) they still are completing faster than the first part (part A). Implicit learning coefficient in this group is equal to 0.2.

Our data are comparable with results obtained by M. A. Cholodnaja that are testifying about low productivity of intellectual activity for representatives of fixed subjects, and confirmed by the results from the method of diagnosis of mnemonic abilities presented below.

**Table 2.** Mean indexes of speed of memorizing simple and complicated material within cleavage (splitting) of the cognitive style field dependence / field independence.

<table>
<thead>
<tr>
<th>Cognitive style</th>
<th>Indexes of efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time for memorizing the simple material (in seconds)</td>
</tr>
<tr>
<td>mobile field dependence</td>
<td>6</td>
</tr>
<tr>
<td>fixed field dependence</td>
<td>18,3</td>
</tr>
<tr>
<td>mobile field independence</td>
<td>8,6</td>
</tr>
<tr>
<td>fixed field independence</td>
<td>10,7</td>
</tr>
</tbody>
</table>

Speed indicators of memorizing the simple and complicated material from 4 selected groups of mobile and fixed-field dependence and field independence subjects suggest that: mnemonic abilities of mobile field independence are more effective than in the representatives of other groups (table 2). This result is most clearly manifested in memorizing of complicated nonsense material (card number 3).

Time of memorizing relying on functional mechanisms of fixed field independence subjects is higher 9,7 seconds in comparison with time of memorizing by mobile field independence. Time of memorizing the simple material by mobile field independence subjects is 8,6 seconds, while the time of memorizing the same material by fixed field dependence subjects is 18,3 seconds.

Time of memorizing the simple nonsense material by fixed field independence subjects is 10,7 seconds, by mobile field dependence subjects is 6 seconds. Therefore, fixed field dependence subjects are demonstrated different (lower) efficiency of mnemonic abilities, already during the memorizing of simple nonsense material. Differently speaking, the fixed field dependence subjects are working out the material slower already at the level of perception the information. There is noted marked weakness of their functional mechanisms. Fixed field dependence subjects are needed much more time for orientation of the proposed material. It must be emphasized that if the time of memorizing the simple nonsense material by mobile field dependence subjects, mobile field independence subjects and fixed field independence subjects isn't differ significantly, so this tendency is clearly enhanced in memorizing of complicated material. Thus, the efficiency of memorizing the complicated material by mobile field independence subjects is 10,1 seconds versus 29 seconds for fixed field dependence subjects. In other words, time of memorizing the complicated material by fixed field dependence is almost 3 times exceeds the time of memorizing by mobile field independence. Time of memorizing of card number 3 in groups of mobile field dependence subjects and fixed field independence subjects is respectively 22 and 28,4 seconds. It should be emphasized that the
time of memorizing of complicated nonsense material by mobile field dependence subjects exceeds time of memorizing by mobile field independence subjects almost 2 times. But the time of memorizing of complicated nonsense material by fixed field dependence subjects and fixed field independence subjects is the same - 29 and 28.4 seconds respectively.

The data from questionnaire, of survey subjects which we conducted after the experiment, allow us to state that the operation mechanisms of mobile field independence subjects are included in the process of memorizing much faster than of fixed field dependence subjects. Most of the subjects of this group used operation mechanisms at the stage of memorizing of trial task.

Mobile field independence subjects are giving the concrete answers on what exactly presentation figure they realized the need to include the operating mechanisms in the process of memorizing. Usually at the 1-2 presentation of complicated nonsense material (card number 3) they do recognize not only the need for careful planning of mnemonic techniques, but also do know exactly what methods they use. This group of subjects is demonstrated a very high rate of deployment mental mnemonic space with a clear awareness of the used operation mechanisms.

The speed of incorporation of operation mechanisms into the memorizing process by mobile field dependence subjects and fixed field independence subjects is somewhat slower. Representatives of these groups did not use the operation mechanisms at the presentation of trial figure.

Fixed field dependence subjects are including operation mechanisms in the memorizing process much slower than subjects of previous groups. Fixed field dependence subjects, on the average, aware the need for planning and inclusion of concrete mnemonic technique in memorizing process only at 5th or 6th presentation of complicated nonsense material (card number 3). These subjects did not give clear answers for questions about the time inclusion of operation mechanisms in memorizing process. For example, "began planning the memorizing in the middle of an experiment, of the testing" or "realized that the figure is complicated only at the stage of 4th – 6th presentation of that material". This suggests that the speed of deployment of mental mnemonic space is lower for fixed field independence subjects than for mobile field independence subjects.

So therefore the highest speed of incorporation of operation mechanisms in the memorizing process was observed in the group of mobile field independence subjects, whereas the lowest rate of incorporation of operation mechanisms in the memorizing process was observed in the group of fixed field dependence subjects.

We can conclude about the level of mnemonic abilities of representatives of selected groups by the aggregate of indicators (productivity of memorizing relying on functional mechanisms, memory efficiency through using functional and operational mechanisms, rate of incorporation of operation mechanisms, level of development of regulation mechanisms).

Table 3. The level of development of mnemonic abilities of subjects under splitting of cognitive style field dependence / field independence.

<table>
<thead>
<tr>
<th>Cognitive style</th>
<th>Developmental level of mnemonic abilities (% of subjects)</th>
</tr>
</thead>
</table>

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So during the analyzing of data obtained from subjects, we identified the following groups depending on their number: [Correlation between the definition of field dependence / field independence by procedure of G. Witkin and the level determined by the method of diagnosis of mnemonic abilities, is r = 0.7 (p <0.01).]

- First group is represented by mobile field independence subjects with a third (12.5%) and fourth (45%) levels of mnemonic abilities development.
- Second group is represented by fixed field dependence subjects with a third (30%) and fourth (2.5%) levels of mnemonic abilities development.
- Third group is represented by mobile field dependence subjects and by fixed field independence subjects with a third (7.5%) and fourth (2.5%) levels of mnemonic abilities development.

For most part of group of fixed-field dependence subjects (30%) there is noted characteristic figuratively – mnemonic type with developing regulation mechanisms in the full formation of all components of functional system of mnemonic abilities (FSMA). Subjects are purposefully and actively working with memorized material. However they do not demonstrate a very high rate of incorporation of operation mechanisms in the memorizing process. Therefore deployment of mental mnemonic space occurs with some delay. Subjects are deploying mental mnemonic space gradually and consistently.

Fixed field dependence subjects are actively guided in the proposed material, using multiple methods of memorizing complicated nonsense material. This group is represented mainly by the subjects with third level of FSMA, they use mainly the following operation mechanisms: grouping - 92%, strong point - 85%, transcoding - 62%, schematization - 8%, structuring - 50% of the group. Fixed field dependence subjects firstly do holistically perceive the image necessary to remember. They start to allocate it in parts only after the wrong reproduction of it (row 3-4). They tend to rely on one of them and at the further expense of memorizing they are used lines, triangles, crosses and intersection formed by these lines. In addition, all subjects that were located on the third developmental level of FSMA, they help themselves by words during reproducing the figures ("It's so, then lower", "Here it is necessary to stop and wipe out here," etc.). They call the shape by words like "snowflake", "house", "alphabet" and "anthill". Most subjects from this group are trying to mentally drawing out the figure, turning it, trying thus way to make memorizing task much easier.

Mobile field independence subjects (45%) are prevailing cognitively - type of mnemonic abilities with domination of the thinking process of memorized material. At the same time leading the way of memorizing are allocated for selection of internal connections in the proposed material. Operating mechanisms are very quickly integrated in the memorizing process. Mobile field independence subjects in memorizing of complicated material are mainly used operation mechanisms like: schematization (70%) and structuring (65%). At the same time they
are less represented operation mechanisms as: group (78%), transcoding (70%), the association (35%). The subjects do not isolate the main part of memorized material, and are stored it entirely. While do isolate the points of intersection of the lines and do continue to drawing out the figure by proceeding from them.

4. CONCLUSION

All mobile field independence subjects who showed the fourth level of FSMA, they do note that highlight the main and secondary in figure is not need, because all elements of scheme or structure make there an integrated circuit. If there are two triangles or cross, subjects seek to impose their right to each other. They do not name by word any memorized figures and do not count specifically lines, triangles and crosses. They do note that all of these elements they do memorize unintentionally, and do believe that the material is memorized effortlessly. Subjects, who discovered the fourth level of FSMA, do not use words to themselves to help for memorizing process, and in questionnaire survey they note that using of the words is "not right" and "not productive" for the mnemonic activity.

Group of subjects characterized by the third level of FSMA (7.5%), during the questionnaire, revealed predominance in memorizing of complicated mindless material by using operation mechanisms of the grouping (75%), the reference point (75%) and analogy (75%). Operation mechanisms like schematization and recoding were presented in the least by 75 % of subjects of that group. Thus, mobile field dependence subjects and fixed field independence subjects inherent in the same techniques of mnemonic activity. These data allow us to conclude that the results obtained in groups of subjects of mobile field dependence and fixed field independence are close as possible to each other in memorizing process of simple and complicated nonsense material.

Representatives of mobile field dependence cognitive style and fixed field independence cognitive style (10%) are demonstrated moderate speed and efficiency in processing out of simple and complicated nonsense material, they show an average rate of incorporation of the operation mechanisms in the memorizing process, and use operation mechanisms like grouping, reference point and analogy, mainly detect third developmental level of mnemonic abilities. Mobile field independence subjects (57.5%) are demonstrate the minimum time for finding a simple figure in a complex figure and they noted the highest rate of implicit learning, with quickly memorizing meaningless nonverbal material, and the fourth level of developmental mnemonic abilities. During memorizing they preferred to use operation mechanisms like schematization and structuring. Fixed field dependence subjects (32.5%) are less effectively in treating with simple and complicated meaningless material, they exhibit low rate of incorporation of the operation mechanisms in the memorizing process, they use primarily grouping, reference point and transcoding, and they present third level of developmental mnemonic abilities. Fixed field independence subjects and mobile field dependence subjects (10%) are differ in results by average in speed of memorizing the simple and complicated material, they use less sophisticated mnemonic techniques than mobile field independence subjects, but more often than fixed field dependence subjects, their mnemonic abilities are at the third and fourth levels in development of mnemonic abilities.
Consequently the results of memorizing of simple and complicated nonsense material by field dependence subjects and field independence subjects with allocation by us the splitting of cognitive style supports the idea of ambiguous relation of cognitive style field dependence / field independence and effectiveness of mnemonic abilities.

Mobile field independence subjects showed the biggest speed of memorizing the simple and sophisticated non-verbal nonsense material, the lowest speed was found in fixed field dependence subjects. Fixed field independence subjects and mobile field dependence subjects showed the middle level of average speed of memorizing the simple and sophisticated non-verbal nonsense material.

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