INTERRELATION OF IMPLICIT LEARNING AND COGNITIVE FEATURES OF PERSONALITY

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Abstract

The article presents the results of an empirical study aimed at revealing the connection between the propensity for implicit learning and the features of the cognitive sphere of the individual. It was revealed that the higher the index of the field independence, the better the results of the indicators of the development of implicit knowledge after the passage of learning. In this case, the dependence on the field is a condition for successful implicit learning in the presence of non-verbal intelligence, which allows you to master the latent algorithm without prior training. The research used the method of presenting color sequences according to the algorithm of A. Reber.

Key words: implicit learning, cognitive style, non-verbal intelligence, color sequences.

Introduction

Implicit learning is one of the most intriguing spheres in the field of cognitive psychology. Of all the others learning abilities, implicit ones are the most permanent and sustainable.

Implicit learning has been under current interest for the long period of time. The term ‘‘implicit learning’’ was introduced by Arthur Reber [1] in sixties, however, researchers were interested in unconscious learning process even before. At the

current time, the linkage between implicit learning ability and various personal characteristics and also between different approaches to cope with a task is being actively studied by researchers from all over the world.

The link between high field dependence level and intellect was already established in researches of many authors, for example, in work of I.P. Shkuratova [2]. In turn, the issue of the correlation between learning efficiency and intellect was touched by Arthur Reber in his study of the approaches to cope with explicit and implicit tasks accordingly to intelligence level (A. Reber). He discovered that there is a link between the ability to cope with explicit tasks and intelligence, but such link between implicit learning ability and intelligence was not founded yet.

Implicit learning can be used as a way to remember complicated rules and algorithms. For instance, researchers O.I. Larichyev and E.V. Naryzhny taught differential diagnosis of two similar in their symptoms diseases — pulmonary embolism and myocardial infarction to medical students through implicit learning [3]. The data collected by them reveals the efficiency of this type of learning. In the present study we achieved the goal to explore the correlation of tendency of individual for implicit learning with such personal cognitive abilities as nonverbal intelligence and cognitive types (field dependence/field independence). This study is based on Reber's researches which basis was the process of artificial grammar learning.

Aims of the study:

1) To identify the tendency for implicit learning via author's color methodology (presentation of color sequences that are based on a hidden algorithm).

2) To measure IQ and field dependence index.

3) To establish a link between the tendency for implicit learning and IQ of test subjects with different cognitive styles.

Organizing, Study Methods

The study was undertaken in 2017. 76 test subjects in the age from 18 to 40 participated in this experiment. All the methods were introduced to them remotely via Google Forms.

Study methods:

- Field dependence/field independence cognitive style identification (Gottshaldt Figures method).
- The identification test of tendency for implicit learning on modified method of color sequences demonstration.
- Raven's Progressive Matrices.

The identification test of implicit learning tendency that we used is based on the classical Reber's experiment, but it was slightly changed. It's basis is artificial grammars learning. These artificial grammars are the ultimate sequences that are based on a given algorithm. In the classical experiment A. Reber used letters, we, in our case, replaced them with color sequences [1, 4].

Process of the experiment. In the beginning, as with the original experiment, the certain number of sequences was presented. Test subjects were required to examine them carefully and then to memorize these sequences. However, there were some specific distinctions. Firstly, our test had the training series consisted of 36 stimulus and the control series of 24 stimulus (60 tasks altogether).The specific feature of the training series was that it's demonstration slide includes examples with correctly completed sequences. Also, after each answer of a test subject a feedback was given that included information about correctness or fallacy of a given sequence. Feedback was given for the improvement of learning process, because the researchers under the leadership of A.Yu. Agafonov from Samara State University discovered that feedback has a positive effect on ability to tackle with tasks involving implicit learning of test subjects [5, 6, 7, 8]. In the control series the color sequences were demonstrated without examples and feedbacks. The task that test subjects needed to

deal with was to classify the given stimulus as correct or wrong according to the implicit algorithm.

Secondly, after the test was completed test subjects were supposed to answer the question: “What they were motivated by, when they gave answers?” Choices of answers were offered: “By logic, I have comprehended the algorithm”, “By logic, I think that there is logic in the sequences, but I roughly comprehend it”, “By intuition, it seems to me that I chose right answers”.

Thirdly, we modified the experiment's structure. In the classic experiment the total number of answers is assessed, but we presented 3-steped scale of assessment: control series tasks (tasks №37-60), tasks from the middle of the training part to the end of the control series (tasks №18-60), and also random tasks from the control series that demonstrate the actual level of correct stimulus recognition. Furthermore, we added an average rating scale.

We rated each scale in accordance with Reber's version-by defining random level of recognition [1]. Therefore, since there are only two options of respond then the possibility of random recognition accounts 50%.

According to the data collected during the first session of the experiment we identified the following groups of the test subjects:

Depending on a cognitive type:

Field dependent

- Field independent

Depending on strength to implicit learning:

- Who learned the algorithm logistically
- Who learned the algorithms implicitly
- Who could not manage to cope with the test

Depending on a level of nonverbal intelligence:

- High
- Above average
- Average

In each group of test subjects, the indicators of nonverbal intellect, field dependence/field independence index and the indicators of successful implicit learning had been under correlation analysis that we did using SPSS program.

The results of the study

Correlation analysis allowed us to identify the following dependencies. In the group of test subjects with high level of nonverbal intelligence (24 test subjects with IQ more than 124 scores) we obtained results that are presented in this table.

Table 1.

The Correlation analysis' Results

		Nonverbal intelligence	**Field independence**	**Control series**	**Training and control series**	**Random recognition**
Nonverbal intelligence	Pearson correlation coefficient	1	.470*	.197	.147	.099
	Sign.(bilateral)		.021	.356	.492	.644
Field independence	Pearson correlation coefficient	.470*	1	.390	.415*	.335
	Sign.(bilateral)	.021		.060	.044	.110

According to the data provided in the chart, the link is established between field independence index and the scale of implicit learning efficiency and also we can see that there is such link between field independence and nonverbal intelligence.

Conclusions

1. According to the sampled data, the link between the strength to implicit learning and a level of cognitive abilities of an individual was established. We discovered that efficiency of the end results of implicit learning was more marked among the subjects with field independent cognitive type.

2. In turn, response rates that demonstrate the best examples of efficiency of implicit learning, which we carried out taking into, account the preparing part of the training series, increase in accordance with levels of nonverbal intelligence. However, these rates are common only in certain groups of test subjects, such as the groups with “above average” level of nonverbal intelligence.

3. Test subjects who high level of nonverbal intelligence had tended to explain their effectiveness to the existence of intuition rather than to logical classification of presented stimulus.

4. There is no clear indication that high level of nonverbal intelligence and field independent cognitive type make implicit learning more effective on the basis of the results achieved. The further survey on the suggestion of a linkage between cognitive abilities of an individual and the tendency for implicit learning should therefore be undertaken with the usage of differential modal stimulus.

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