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Involuntary Memorization and Context-Dependent Recognition of Lexical Information

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Abstract

Introduction. Two lines of research stand out in the field of context-dependent memory research: context-dependent reproduction and context-dependent recognition. Different environmental contexts influence the productivity of involuntary memory using free playback and recognition techniques. Our study aims to establish the influence of external contexts of involuntary memorization of lexical items on their subsequent recognition performance. **Methods.** The procedure varied the states of two variables: global context (room view) and local context (background color and localization of the word on the screen). In the first phase, 107 subjects performed a sensorimotor task that involved the identification of a target stimulus with a recognizable characteristic (the letter 'a' as part of a word). In the second stage, where contextual conditions varied, subjects were required to recognize previously presented words in a series of new distractor words. The recognition accuracy, the reaction time, and the response confidence were evaluated. **Results.** It was found that the empirical markers "recognition accuracy" and "reaction time" are uninformative in assessing mnemic productivity. The analysis of the indicator "degree of confidence" showed that regardless of the retention / change of contexts, correct answers are given with greater confidence. Repetition of the local context in the situation of verbal stimuli recognition leads to a decrease in response time and an increase in confidence for words with the recognition feature that was relevant to the goal of the activity during memorization. Changing the global context does not induce a similar effect. **Discussion.** The main factors on which the recognition of lexical units during their unintentional memorization depends are the local context and the "key

feature" (E. Tulving) with which the response was associated during encoding. The study of the role of motor context in mnemic activity may become a perspective in the study of the phenomenology of context-dependent memory.

Keywords

involuntary remembering, context-dependent memory, context-dependent recognition, recognition trait, local context, global context

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Introduction

Perception and encoding of information, as well as any other mental activity, are carried out under certain physical conditions, in a specific environment, in the context of the situation. Due to the triviality of this consideration, the role of contextual factors in mnemic activity is often underestimated. At the same time, in many cases, the reconstructed context of memorization can serve as an effective clue that facilitates the retrieval of the necessary information.

A vivid example of contextually mediated memory is given by A. R. Luria (1994), who for many years studied Shereshevsky's phenomenal abilities: *"Experiments have shown that he can successfully...reproduce any long series of words given to him a week, a month, a year, many years ago. Some of these experiments, which invariably ended in success, were conducted 15-16 years (!) after the primary memorization of the series and without any warning. In such cases, Sh. sat down, closed his eyes, paused, and then said: "yes, yes... It was in your place in that apartment ... you were sitting at the table and I was on the rocking chair..., you were in a gray suit and you looked at me like that... there. I can see what you were saying to me..." - and what followed was an unmistakable reproduction"* (p. 10).

Paradoxically, it is sometimes more difficult to recover arbitrarily memorized material in consciousness than in the context associated with it, which, in most cases,

is remembered implicitly or, rather, involuntarily. This, in particular, is emphasized by J. Godefroy (1992): *"The context in which an event occurs is sometimes more important for memorization than the event itself"* (p. 351). Repetition of the encoding context in a playback situation often helps to retrieve the necessary information. Thus episodic memory helps to activate traces of semantic memory.

It is generally believed that studies of the phenomenology of context-dependent memory were initiated by E. Tulving, who proposed the so-called ***principle of specificity of encoding***. According to this principle, the similarity of conditions during memorization of information and its retrieval contributes to the effectiveness of reproduction (Tulving & Thomson, 1971; Tulving & Thomson, 1973). The works of E. Tulving and his colleagues mainly concern the study of associative or otherwise key features that facilitate access to the information sought. For example, in one of the experiments, subjects were asked to memorize words grouped into semantic categories, indicating the name of each of them. In the test task, one group was shown the names of the categories as hints, while the other group was not given these names. It appeared that subjects in the experimental group reproduced more stimulus words compared to a control condition where participants were not given associative cues (Tulving & Pearlstone, 1966). *"The accessibility of a particular 'engram' for actualization*," points out V. V. Nurkova (2009), "is *determined by the coincidence of the key elements of the situation of imprinting and reproduction"* (p. 60). However, it should be noted that "key elements" in E. Tulving's research referred rather to the structure of the mnemic task rather than to the external conditions under which memorization and then reproduction took place. In other words, these elements ("attributes", in Tulving's terms) were not components of the situational context, but were part of the task condition itself.

A further study of contextual variables was associated with determining the role of local factors and conditions (mainly environmental) in the process of solving mnemic tasks of different types. Since the 1970s, the field of phenomenology of context-dependent memory not only began to expand rapidly, but also ceased to be homogeneous. Within this field, two main streams of research can be distinguished: context-dependent reproduction and context-dependent recognition. This division is not accidental, since the retention of information in memory in experimental procedures is predominantly judged by the performance of reproduction or recognition. Furthermore, for a differentiated assessment of the effects of contextual dependence, the cognitive task to be solved in a memorization situation is essential. In one case, it requires consciousness control, that is, the material is memorized arbitrarily. In another case, no mnemic task is set before the subject; in this case, an involuntary form of memorization takes place. The effects of context-dependent memory may differ markedly depending on the nature of the cognitive task solved at the moment of memorization, the method of evaluating the preservation of the material, and the contextual characteristics that, to a different extent, condition the capture and actualization of the information sought. This actually confirms the review of experimental works on context-dependent memory, devoted exclusively to

the influence of environmental variables or, otherwise, external-contextual factors (Smith & Vela, 2001).

The contexts of mnemic activity can be not only the physical environment, dispositions of situation elements, and stimulus conditions, but also "internal" factors, such as psychophysiological state, mood, or emotions (Eich, 1995; Eich & Metcalfe, 1989; Balch, Myers, & Papotto, 1999; Isarida & Isarida, 1999). For example, reproduction has been shown to be more productive if the subject is in the same emotional state when explicating the material as he or she was at the time of memorization (Robinson & Rollings, 2011). The congruence effect (albeit of a different kind) is also expressed in the fact that emotionally positive material is learned better if the person is experiencing positive emotions, while negative information is more firmly memorized in an emotionally reduced state (see Izard, 2000. pp. 87, 88). S. Smith (1995) proposed the concept of mental context, which includes not only mood and psychophysiological state, but also motivational component, to designate the whole set of variables related to the subject of mnemic activity.

As mentioned above, in research practice (as well as in everyday life), it is possible to judge the retention of memory traces on the basis of the productivity of free reproduction or recognition. The consideration of works performed using these methods of testing the retention of material will help to better understand the peculiarities of contextual effects arising in different types of mnemic activity.

Context-sensitive playback

The study of the proper effects of the environmental context (physical environment) on memory performance was stimulated by the research of D. Godden & A. Baddeley (1975), the results of which later became widely known. In their experiment, subjects, who were divers, memorized words in two environments: underwater and on land. It turned out that reproduction was significantly more effective in the same environment in which memorization took place. (It was later experimentally shown that even mental representation of situational conditions of memorization, as in the case of Szereszewski, facilitates reproduction (Smith, 1979)). Most often in the psychological literature, the context-dependent memory effect is understood as an improvement in reproduction performance when the situational conditions of encoding and retrieval are consistent (identical or similar).

To be fair, it should be noted that the replication of the classic experiment by D. Godden and A. Baddeley did not reveal a pronounced effect of context dependence (Murre, 2021). The author of the study, without questioning the phenomenon of context-dependent memory, explains the result obtained by the significant influence of local determinants, which were somewhat different in the original study and its replication (type of aquatic environment, immersion depth, water temperature, retention interval time, etc.).

The context of place as a special case of environmental context was the subject of a recent study by Choi et al. (2023), who in a real-life everyday life setting recorded subjects'

location every 60 seconds for five weeks using GPS. The test trial required participants to recall their location at a specific time. The authors found: performance increased if the test measurements were taken in the same external context as the previous one.

Contextual variables can be not only the physical environment or location, but also any external factors such as acoustic, olfactory, and even gustatory stimuli. For example, in a study by Grant et al. (1998), students studied academic material (a paper on psychoimmunology) in quiet or noisy conditions, and contextual dependence was assessed using short answer and multiple choice tasks. It was found that regardless of the method of evaluating playback, performance was higher when the encoding and retrieval contexts were matched.

In turn, the study by Ocker & Kreitler (2018) aimed to identify the dependence of the quality of learning while watching a video on the taste of chewing gum. The expected context effect was not found: chewing gum at the time of learning and during playback has no positive effect on recall. The effect was not observed in other similar experiments (Tucha, Mecklinger, Hammerl & Lange, 2004; Miles & Johnson, 2007; Reinhart, 2015).

Several studies have provided evidence for the influence of odor context on reproduction (Hackländer & Bermeitinger, 2017; Cann & Ross, 1989; Ball, Shoker & Miles, (2010); Isarida et al., 2014; Parker, Ngu & Cassaday, 2001 and others), the color of the background against which the focal information was perceived (Isarida & Isarida, 2007), background music (Balch, Bowman & Mohler, 1992; Balch & Lewis, 1996; Mead & Ball, 2007), and video context (Sakai, Miyamoto, Isarida & Isarida, 2011).

A meta-analysis of 75 experimental studies showed that the effects of environmental context were significant in almost all studies, although their magnitude varied widely (Smith & Vela, 2001). When environmental influences are suppressed due to some factors, the effects of contextual dependence of playback are reduced. Such factors include associative processing of semantic information during memorization, inter-element encoding, and mental representation of elements not included in the encoding context. In other words, all cognitive activities that reduce receptivity to context shade and thus attenuate the effects of contextual variables (Smith & Vela, 2001).

Context-dependent recognition

Experimental evidence on the influence of external context on reproduction is generally not as inconsistent as the results of studies of context-dependent recognition, especially of verbal stimuli. Some studies have failed to detect context-dependent recognition (Baddeley, 1982; Godden & Baddeley, 1980; Smith, Glenberg, & Bjork, 1978).

A. Baddeley, using the technique of recognition rather than free reproduction, found no pronounced effect of context. In the author's opinion, physical conditions can significantly help in determining the place of a trace in the memory store but do not stimulate the recognition of the desired stimulus elements. In other words, the external context in the process of recognition does not provide additional advantages for trace actualization (Baddeley, 2001).

Indeed, during replay, any elements of the perceived situation in which the target information was memorized can serve as a means of facilitating (improving, increasing the efficiency of) its retrieval. In recognition tests, however, the stimulus presented is already a correct hint that does not simply lead to the correct answer, but represents such an answer. According to the "outshining" hypothesis, contextual information is "outshined" rather than disappeared during testing, so the possibility of influencing the choice of desired stimuli against the background of the recognition objects itself is lost (Smith, 1994). Due to this, contextual variables in recognition should have less weight than in playback. According to the results of the analysis of S. Smith & E. Vela (2001) mentioned above that the use of recognition decreases sensitivity to changes in external context, but at the same time it is maintained. A series of works carried out by K. Murnane & M. P. Phelps (1993, 1994, 1995) is evidence of this. The context in their procedures was configurations of stimuli presented on a screen. The target words were recognized in old and new configurations. In most of the experiments by C. Mournein and M. Phelps, it was found that the reconstructed contexts compared to the new contexts had a positive effect, namely that target words were recognized better in the old context. (Notably, the old contexts provoked false alarms, i.e., increased false choice reactions.) These results are consistent with data presented by Chun et al., who found that repetition of a previous distractor configuration acting as a contextual cue significantly speeds up target stimulus retrieval, while the configurations themselves are remembered implicitly (Chun, 2000; Chun & Jiang, 1998) . There is other evidence in favor of recognizing context-dependent recognition of nonverbal information (Malpass, & Devine, 1981) .

In a series of experiments using verbal stimulus material, data have been obtained demonstrating the effects of place context (Canas & Nelson, 1986; Emmerson, 1986; Smith, 1985; Smith, 1986), the effects of video context (Isarida et al., 2020), and the effects of environmental context (virtual/real) on recognition performance (Parker et al., 2020).

The severity of contextual effects should decrease with increasing cognitive load at the time of memorization. The more mental effort expended in processing perceived information, the less the dependence of encoding on environmental context is preserved. S. Smith (1986) demonstrated the influence of the level (depth) of information processing during memorization on recognition accuracy. Surface processing showed an effect of the situational context (place context), whereas deep processing of the material eliminated contextual dependence. However, this result was not replicated in other work (Smith, Vela & Williamson, 1988). Thus, the question of whether there is a dependence of recognition on external contextual factors still needs to be clarified.

Purpose and hypotheses of the study

Studies of the phenomenon of context-dependent recognition are mainly concerned with involuntary memorization, while the effects of context on involuntary memory are rarely the subject of independent study. The **aim of our study is to** determine the

influence of contextual conditions on the efficiency of lexical material recognition during its involuntary memorization.

Experimental works on this topic usually assess the volume of mnemonic production or the number of identified stimuli when using recognition tests. We decided to supplement the empirical markers of success with the indicators "reaction time" and "degree of confidence in the answer" in order to obtain a more detailed picture of the results. In addition, the motor response associated with the selection of a relevant stimulus can also be considered as a kind of context, so the procedural conditions were organized in such a way that it was possible to test the influence of this factor as well.

The external variables that may be relevant for context-dependent recognition, according to our assumption, refer to two different plans of the situation (episode): central and peripheral. The central plane consists of the characteristics of the immediate background against which the target information is perceived as a figure (mainly spatio-temporal, intensity, and chromatic characteristics). This is the *local context of* perception and involuntary memorization. The peripheral plane is formed by the object environment, which is the context of place or, otherwise, the *global context*.

On the basis of this, the following **hypotheses** were formulated before the experiment procedure:

1. The recognition efficiency will be greatest when the global and local contexts of involuntary memorization of lexical items cooperate.
2. Preserving local encoding context has a greater impact on word recognition productivity than preserving global context.
3. The efficiency of recognizing words that were accompanied by a motor response during memorization will be higher compared to words that are not associated with a response.

Methods

Test subjects

A total of 107 volunteers aged 17 to 36 years (M = 22) were recruited to participate in the experiment. Of these, 68 subjects were female. All participants had normal vision. The sample was divided into four experimental groups: EG1 (29 subjects), EG2 (29 subjects), EG3 (26 subjects), and EG4 (23 subjects). There was no payment for participation in the experiment.

Procedure and stimulus material

A computer program was written to perform the procedure, allowing to change the stimulus elements and their sequence, to set the time of stimulus presentation, to record

reaction time and response confidence, and to save the results in a database with the possibility of their further processing.

The experiment was carried out in two rooms: a workroom and a training room (computer class). The procedure was organized in two stages. The first stage took place in the workroom and was invariant for all groups. Participants were informed before the test began that the study was devoted to the study of attention. The second stage of the procedure was not reported.

During the first stage, 152 words with denotative (subject) meanings (*table, star, lake,* etc.) were successively presented on the monitor screen (screen diagonal 15.6 inches. Font size - 72, font - Times New Roman, color - black). Of these, 32 words, which were subsequently used in the second stage, were conventionally labeled «relevant», and the rest were labeled "irrelevant". The screen was divided into two equally sized windows: a yellow window on the left and an orange window on the right (Fig. 1). The colors and their localization did not change during the procedure. All words were presented in the center of one of the windows in pseudorandom order. No more than two consecutive stimuli were presented in the same screen window.

Figure 1
Screen view

Half of all words contained the letter "a". The relevant words in 50% of the cases (16 words) also contained the letter "a". All relevant words with the letter "a" were presented only in the right window of the screen on an orange background. Accordingly, relevant words without the letter "a" were presented only in the left window on a yellow background. For irrelevant words, this rule did not apply. A total of 76 words with the letter "a" were presented in each screen window.

To control for the possible effect of the edge factor, in the stimulus sheet, the relevant words in both the first and second phases occupied positions ranging from the 22nd to the 130th word.

According to the instructions, subjects had to respond by pressing the Enter key only to the presentation of words containing the letter "a". The reaction time and other indicators were not recorded in the first stage.

After completion of the first phase, the second phase of the procedure began 120 ± 10 seconds later, during which the irrelevant stimuli and the instruction to the subject were changed. The previous irrelevant stimuli were replaced with 120 new words. The background color localization and the list of relevant words were not changed. Instructions to the subject: "You should respond as quickly as possible by pressing the Enter key only to the words that were presented to you earlier. After that, you should evaluate the degree of confidence in the correctness of the recognition". The degree of confidence after each reaction was assessed on a scale of -2 to +2 ("not sure" / "rather not sure" / "rather sure" / "sure"). At this stage, the following was recorded: the number of correct choices, the number of incorrect choices (false alarms), reaction time (RT), and the degree of confidence in the response.

In the absence of a motor response, the word was exposed for 1600 ms, after which the next word was presented. After the motor response, the word was removed from the screen, and a response confidence scale was presented on a white background in the center of the screen. Using the ← or → keys, the appropriate value had to be selected. After pressing the Space key, a new word appeared.

The reaction time obviously depends on gaze fixation prior to stimulus exposure. If the localization of the word changes compared to the presentation of the preceding stimulus, this is highly likely to delay the sensorimotor response. If, however, the preceding word is exposed in the same screen window as the actual perceived word, no saccade time is spent. Given this fact, the number of relevant words presented in the same screen window as the preceding word and the number of relevant words that change localization relative to the preceding stimulus were equalized when composing the stimulus sequence.

The experimental design required the manipulation of two independent variables: the global context (GC) and the local context (LC). This distinction was explained both by differences in the number and nature of the association of context elements with target information and by the timing of context persistence. Unchanging contexts that include a large number of elements are usually referred to in the psychological literature as global contexts, whereas contexts that include a minimal number of informational features and that change in short time intervals are referred to as local contexts (Glenberg, 1979; Bergmann & Schubö, 2021).

The LC in our case means the color of the background on which the relevant words were presented. Since the localization of the background color did not change at the second stage, the LC was a combination of "localization+background". The HC was the type of room (workroom or classroom). Thus, each of the independent variables had two states: retention/context change in the second step of the procedure. When the LC was preserved, the relevant words in the second stage were presented at the same location

on the screen, against the same background, and at the same positions in the stimulus sequence as in the first stage. When the LC for relevant words was changed, the sequence number on the stimulus sheet was changed, the background color was changed to an alternative color, and the localization was changed accordingly. Maintenance of the HC meant that the second stage was conducted in the same room as the first stage (workroom). If the GC was changed, the second stage was held in a different room (study room).

The conditions of the second stage differed for the experimental groups. In EG1 in the second stage, LC and HC remained unchanged. In EG2, LC was changed and HC was preserved. In EG3, LC was maintained and GC was changed. In EG4, both LC and GC were changed. (See Table 1). The characteristics of the screen did not differ when the HC changed.

Table 1
Conditions of passing the second stage for different experimental groups

	Local Context (LC)	Global Context (GC)
EG1	+	+
EG2	-	+
EG3	+	-
EG4	-	-

Results

Since the groups differed in the number of participants, initially, for each experimental condition, the mean values were calculated for all reactions and separately for true responses and false alarms. The results are presented in Table 2.

Table 2
Average values of identification performance

EG	Average number of reactions	Average number of correct answers	Average number of false alarms
EG1	57,7	17,2	40,4
EG2	43,6	14,4	29,2
EG3	39,4	15,5	23,9
EG4	46,3	15,9	30,4

Table 2 shows that in EG1 subjects, the most number of answers, both true and false. The number of correct answers in each group turned out to be less than the number of false alarms. Calculating the significance of differences in the ratio of the total number of correct and erroneous answers (χ^2 criterion), showed that this ratio is different under different experimental conditions ($p < 0.01$).

The mean values and standard deviation were calculated to analyze the results for the BP parameter. The results outside the interval $\bar{X} \pm 2\sigma$ were excluded from further analysis. The outliers amounted to 5-6% of the extreme values for each EG. Table 3 shows the mean BP values for correct and incorrect answers for each group.

Table 3
Reaction time for correct and incorrect answers (ms)

	All reactions		Significance level
	Faithful	Erroneous	
EG1	868,3	878,6	0,399
EG2	877,1	844,0	0,217
EG3	906,3	931,8	0,052
EG4	878,3	926,3	0,003

The BP for correct and false answers was found to not differ significantly, except for EG4, where the BP for false alarms was significantly increased, compared to the BP for correct answers ($p = 0.003$) according to the Student's t-criterion.

In addition, the mean values of the degree of confidence in the answer and the significance levels of differences in this indicator for correct and incorrect answers were calculated. Data are summarized in Table 4.

Table 4
Degree of confidence in the answer

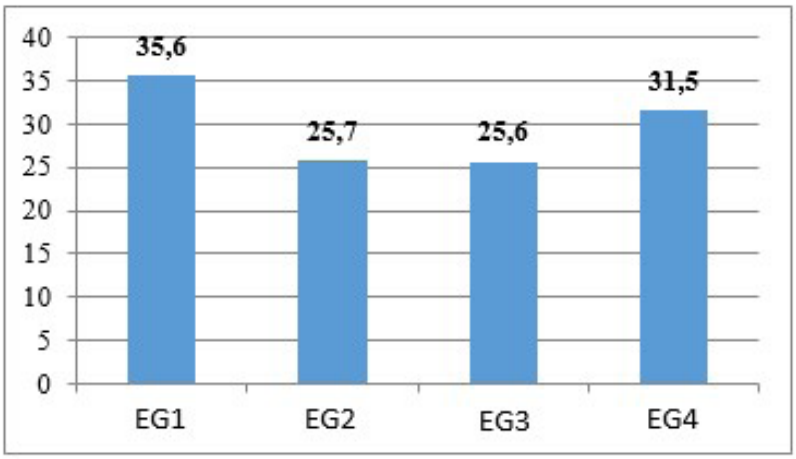
	All reactions		Significance level
	Faithful	Erroneous	
EG1	0,96	0,69	0,000
EG2	0,89	0,48	0,000
EG3	1,12	0,66	0,000
EG4	1,06	0,60	0,000

Confidence was found to be significantly higher ($p \leq 0.000$) for correct answers regardless of the experimental conditions (Student's t-test).

The subject of a separate analysis was reactions to words that had the letter "a" in their composition. Figure 1 shows the average values of the number of such reactions for different groups of subjects.

Figure 1

Average number of reactions to words with "a"



The average number of reactions to words with "a" was found to be higher in EG1. The number of such reactions is significantly influenced by contextual variables. The correlation between the factor and the result characteristics is statistically significant according to the χ^2 criterion ($p < 0.001$).

The analysis of BP for correct and incorrect responses to words with "a" revealed that in EG1 and EG3, where the local context was preserved, the fastest correct response was given (839.5 and 874.3 ms, respectively). However, there was a slowing of BP in these groups for correct responses to words without "a" (900.9 ms and 961.5 ms, respectively). There was only one statistically significant difference between the groups in terms of the timing of correct responses to words with "a": EG1 and EG2 ($p \leq 0.037$) (local context change). The BP in EG1 is significantly lower than in EG2 (839.5 and 879.2 ms, respectively). The other groups do not differ from each other in terms of BP for correct answers to words with "a".

The influence of HC can be seen against the background of preservation of LC (EG1 and EG3) and against the background of its change (EG2 and EG4). EG3 subjects were significantly slower to respond to words with "a" ($p = 0.000$). With the change in LC, the HC factor did not affect BP on words with "a" for correct and incorrect responses. At the same time, in EG2 and EG4, the RTs for words without "a" were significantly slower regardless of the correctness of the response (846.3 and 925.0 ms, respectively, at $p = 0.000$).

The degree of confidence in *correct answers is* significantly higher for both words with "a" and words without "a". This rule is partially violated in EG1 and EG3, where LC did not change. Here, the differences in confidence do not reach significance between the correct and incorrect responses to the presentation of words without "a". However, for EG1, EG2, and EG3, response confidence is significantly higher for responses for words with "a" than to words without "a". In EG4, this pattern was not found.

Changing the LC while maintaining the HC (EG1 and EG2) resulted in a significant decrease in response confidence when responding to words with "a" (1.014 and 0.860, $p = 0.004$), without "a" (0.626 and 0.401, $p = 0.002$), in both correct responses to words with "a" (0.91 and 0.70, $p = 0.002$) and incorrect responses to words without "a" (0.576 and 0.285, $p = 0.001$). Comparison of EG2 and EG3 also confirms the significant effect of LC on response confidence. Preservation of LC when GC is changed (condition in EG3) provides significantly higher confidence scores for responses to words with "a" (0.860 and 1.006, $p = 0.017$) and words without "a" (0.810 and 0.401, $p = 0.000$), both for correct responses ($p = 0.033$) and incorrect responses ($p = 0.000$). Against the background of LC preservation, the HC factor had no effect on the degree of confidence in the answer: EG1 and EG3 do not have significant differences in this parameter.

Discussion

The analysis of the data obtained allows us to state that changing the contextual conditions does not affect the accuracy of recognizing lexical units. Despite the fact that when the conditions of involuntary memorization and recognition are fully matched, i.e. when both the context of place and local context are preserved, an increase in the number of correct answers is observed, this result cannot be regarded as evidence of higher recognition efficiency. The increase in the number of correct responses in this case, is associated with an increase in the total number of responses, including erroneous responses. It can be assumed that the congruence of contextual conditions provokes more frequent responses when solving the recognition task. Meanwhile, under all contextual retention/change conditions, there is a significant increase in the proportion of false alarms in the total number of responses. This result is quite consistent with the data of McKenzie & Tiberghien, (2004) who showed in their work that when, according to the instruction, it is necessary to make a choice "as quickly as possible" (as in our case), the number of false alarms increases, and when a certain amount of time is given for the response, the number of recognition errors decreases. In addition, in our opinion, when solving the recognition task, the significance of the omission error for the subject is higher than the significance of the false alarm error. And the more choices are made, the greater the number of correct answers. The increase in the number of correct answers, or in other words, the decrease in errors of omission, paradoxically depends on the number of false alarms. Thus, we can state that the indicator of "recognition accuracy" is not informative for assessing the efficiency of lexical information recognition during its unintentional memorization.

As the results showed, the comparison of BP for correct and incorrect answers, in general, did not reveal significant differences. This is probably also due to the priority of the goal of correct guessing for the subjects. The test task involved the identification of the words being searched, and this task was facilitated by an increase in the total number of responses due to false alarms, rather than by an increase in reaction speed. In other words, performance on the test task required, first and foremost, correct word identification. Setting a fast response would have prevented a correct solution.

The results concerning the empirical marker "degree of confidence in the answer" were unambiguous. A pronounced effect was found in all groups: the confidence is significantly higher for correct answers. In turn, this suggests that subjects implicitly distinguish between their correct and incorrect responses. Similar results were previously obtained in other studies whose authors offer similar explanations (Aleshina, 2012; Odainik, 2013). We can quite agree with A. S. Odainik (2013), who points out: *"Confidence is a reaction to the effectiveness of a decision, and a person is able to distinguish between right and wrong answers without much effort, but the process of distinguishing itself is not realized"* (p. 24). In the model of decision-making in a situation of uncertainty, confidence is considered as an indicator of the right choice, and it is *"often the only psychological means of predicting and controlling the correctness of decisions"* (Skotnikova, 2019, p. 145).

Since the classical studies of P. I. Zinchenko (1961), it has been known that the efficiency of involuntary memorization depends directly on the nature of the cognitive activity performed by the subject. In our study, participants at the first stage solved the simplest task of visual search for a given target (the letter "a") as part of a word, which, in turn, had a certain localization on the corresponding background. In other words, the target letter was embedded in the context of the word and the word was embedded in the local context. This determined the perceptual conditions of the activity being performed. For the task solved in the first stage - distinguishing between words with and without the letter «a», the letter "a" was an identifying feature, the detection of which was accompanied by a motor reaction. Thus, a motor component was also included in the structure of cognitive action as its final link. Since the efficiency of involuntary memorization is related to the specificity of cognitive activity at the moment of encoding, it is to be expected that differences in mnemic performance should be most noticeable for a) words with and without an identifying feature and b) words retaining or changing the local context. Indeed, it was found that subjects in each group more often randomly chose words with an identifying feature, i.e., with the letter "a", as the stimuli they were looking for. Overall, the number of such choices amounted to 63% of the total number of reactions. However, it cannot be claimed that changing or maintaining contexts has a significant effect on this.

An important result is that maintaining the local context increases confidence for responses to all words with "a", regardless of the correctness of the response, while changing the local context causes a marked decrease in confidence. This is not the case for place contexts. Furthermore, replicating the local context in the second stage

causes a significant decrease in reaction times for correct choices of recognition feature words compared to incorrect choices of similar words, while changing the local context significantly increases the correct reaction times.

Thus, the results of the study suggest that the key factors conditioning the recognition of lexical information during its involuntary memorization are the **local context** and the recognition **feature** that is relevant to the goal of the activity in the memorization situation.

Conclusion

Context effects manifest themselves in the solution of a wide variety of cognitive tasks (Agafonov, Zolotukhina, Kryukova, Burmistrov, 2023; Kryukova, Zolotukhina, Agafonov, Shilov, 2023). Meanwhile, contextual influences on problem solving have perhaps attracted the most interest among memory researchers. To date, a large body of data relating to the effects of environmental (external) contexts on the reproduction and recognition of both verbal and nonverbal information has been accumulated. The experiments conducted earlier are mainly related to the field of arbitrary memorization.

In our work, the object of the study was the involuntary form of memorization of lexical material. The ambiguity of the obtained results is caused by the difference in the informativeness of empirical indicators, the analysis of which allows us to evaluate the productivity of recognition in different ways under varying contextual conditions. In particular, the indicators of recognition accuracy and response time turned out to be uninformative, while the parameter "confidence in choosing an answer", although indirect, allowed us to detect differences indicating implicit processes involved in mnemic activity.

The conceptual basis for explaining part of the results obtained was the main provisions of P. I. Zinchenko's concept and E. Tulving's principle of coding specificity. Not only the nature of cognitive activity and the information operated by the subject during unintentional memorization, but also the "key" (identifying) feature associated with the answer when solving a cognitive task determine the productivity of memorization.

A perspective in the study of context-dependent memory may be the study of the role of motor context. To date, there are no studies in which this kind of context has been the subject of special consideration.

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Alexander K. Grishin– preparation of materials for the theoretical review, carrying out the research procedure.

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Information on conflict of interest

The authors declare that there is no conflict of interest.