

ILLUSION OF KNOWING IN METACOGNITIVE MONITORING: REVIEW OF POSSIBLE CAUSES AND CONSEQUENCES

Ruslana Kalamazh, Maria Avhustiuk,

National University of Ostroh Academy, Ostroh, Ukraine;
maria.avgustiuk@gmail.com

The paper highlights possible causes and consequences of the illusion of knowing in metacognitive monitoring of the learning activity of university students through the effects of different types of information proposed, and also of personal, cognitive, metacognitive, and individual psychological characteristics of university students ($n = 262$; $M = 19,5$; $SD = 1,87$). According to the results, the illusion of knowing occurring mostly in prospective judgements of learning can be caused by the type of information (it was higher in the statements), task type (it appeared in multiple-choice questions), text length (its levels were higher in larger texts) and style (overconfidence occurred while learning the texts of the belletristic style). Female students tended towards slight overconfidence and the illusion of knowing was more typical for younger students with lower levels of academic achievements. Possible consequences of the phenomenon, ways of its annihilation, and further avenues for research are also described.

Key words: illusion of knowing, illusion of not knowing, metacognitive monitoring, overconfidence, underconfidence.

Руслана Каламаж, Марія Августюк. Ілюзія знання в метакогнітивному моніторингу: огляд можливих причин та наслідків. У статті розглянуто можливі причини та наслідки ілюзії знання в метакогнітивному моніторингу навчальної діяльності студентів за допомогою різних видів інформації, що подана до опрацювання, а також через особистісні, когнітивні, метакогнітивні й індивідуальні психологічні характеристики студентів ($n = 262$; $M = 19,5$; $SD = 1,87$). Відповідно до отриманих результатів, ілюзія знання, виникаючи здебільшого в проспективних судженнях про вивчене, може бути спричинена видом інформації (простежено вищі рівні ілюзії знання у твердженнях), тестового завдання (у запитаннях із багатьма варіантами відповіді), обсягом тексту (вищі рівні ілюзії знання спостерігали в більших за обсягом текстах) та стилем (надмірна впевненість під час опрацювання тестів художнього стилю). Дівчата показали вищі показники надмірної впевненості, а загалом ілюзія знання більш притаманна для молодшої вікової групи студентів, особливо тих, котрі мають нижчі рівні навчальної успішності. Також окреслено можливі наслідки ілюзії знання, способи її нівелювання та перспективи майбутніх досліджень.

Ключові слова: ілюзія знання, ілюзія незнання, метакогнітивний моніторинг, надмірна впевненість, недостатня впевненість.

Руслана Каламаж, Мария Августюк. Иллюзия знания в метакогнитивном мониторинге: обзор возможных причин и последствий. В статье изучаются возможные причины и последствия иллюзии знания в метакогнитивном мониторинге учебной деятельности студентов с помощью различных видов информации, которая исследовалась, а также через личностные, когнитивные, метакогнитивные и индивидуальные психологические характеристики студентов ($n = 262$; $M = 19,5$; $SD = 1,87$). Согласно полученным результатам, иллюзия знания, возникая преимущественно в проспективных суждениях об изучении, может быть вызвана видом информации (наблюдались более высокие уровни иллюзии знания в утверждениях), видом тестового задания (в вопросах со многими вариантами ответа), объемом текста (высокие уровни иллюзии знания наблюдались в больших по объему текстах) и стилем (чрезмерная уверенность во время обработки тестов художественного стиля). Девушки показали высокие показатели чрезмерной уверенности, а в целом иллюзия знания была более присущей во младшей возрастной группе студентов, особенно тех, которые имеют низкие уровни учебной успеваемости. Возможные последствия иллюзии знания; также очерчены способы ее нивелирования, как и перспективы будущих исследований.

Ключевые слова: иллюзия знания, иллюзия незнания, метакогнитивный мониторинг, чрезмерная уверенность, недостаточная уверенность.

Background of the Problem

The illusion of knowing is understood as a conceptual problem in the learning process. It is viewed as subjective overconfidence in the correctness of information learning and understanding; as overconfidence in the correctness of task performance; as overconfidence in the ability to remember information that is difficult or even impossible to remember, etc. In the first studies (Glenberg, Wilkinson, & Epstein, 1982) the illusion of knowing was defined as the belief that comprehension was attained when it failed. In our study the illusion of knowing is viewed as metacognitive monitoring error resulting from subjective overconfidence in knowing that does not meet objective success of task performance (Pasichnyk, Kalamazh, & Avgustiuk, 2017; Avhustiuk, Pasichnyk, & Kalamazh, 2018).

The phenomenon has different spheres of its occurrence. The illusion of knowing can take place in texts, statements, and word pairs learning. Resulting from inaccurate calibration, the phenomenon is preceded by the illusions of competence, remembering, familiarity, understanding, etc.

Despite a number of studies, inconsistency of the terminological apparatus in the psychological literature provides no single explanation for the causes and mechanisms of the illusion of knowing, and thus significantly complicates the study of this notion. The illusion of knowing is caused by

two phenomena. These are incompetence to identify contradictions and overestimation of understanding level. None of these, though, can be a single cause of false confidence in the accuracy of learning.

In the psychological literature the illusion of knowing usually tends to be used alongside other terms such as overconfidence (Gigerenzer, Hoffrage, & Kleinbölting, 1991; Pulford, 1996; Eakin, 2005, etc.), cognitive optimism (Metcalfe, 1998), subjective overconfidence in self-knowledge (Savin & Fomin, 2013), etc. An important role in evaluating task performance correctness is played by overconfidence that occurs when confidence ratings of judgements are higher than the received level of actual performance. Thus, Savin and Fomin (2013) received empirical results that show no linear relationships between knowledge and confidence in it resulting in ‘the more I know, the more confident I am’. Researchers pointed to a dynamic connection between the level of knowing and confidence that initially reduces and afterwards increases.

Numerous studies prove human inefficiency in judgements, but not the presence of systematic errors (Dunning et al., 2003). Thus, overconfidence is not reduced through random tasks selection, does not disappear when making estimations, and cannot be regarded as entirely negative, regressive phenomenon (Kahneman & Tversky, 1996, etc.). The bases of overconfidence can be Probabilistic mental models (PMM) (Brunswikian theory of confidence) (Gigerenzer, Hoffrage, & Kleinbölting, 1991).

In the study of the mechanisms of metacognitive judgements there are two opposing theories. The first theory is the theory of direct access to information or so-called ‘availability hypothesis’ that activates the feeling of knowing about the presence of a correct answer in memory. The second is the theory of cue familiarity of the learned information. According to it, cues and heuristics are divided (Koriat, 1997) into three classes – intrinsic, extrinsic, and mnemonic. They can cause overconfident subjective predictions about the likelihood of future information performance.

According to Metcalfe (1998), the basis for the illusion of knowing is cognitive optimism that is caused by self-deception. Its aim is to optimize different cognitive activities. It means that people know that their answers are wrong, but convince themselves in contrary arguments because they want to think they have high levels of cognitive ability to reproduce information.

Moreover, the illusion of knowing is discussed in the scientific literature not only as a psychological, but also as a methodological problem (because of poor operationalization, incorrect calibration, etc.).

Thus, as the illusion of knowing is a very controversial phenomenon, the **aim** of the paper is to analyze the causes of the illusion of knowing with the help of the singled out personal, cognitive, metacognitive, and individual psychological characteristics of university students, and also of the effects of different types of information proposed. The reason for the empirical study of the illusion of knowing from across the spectrum of different characteristics has theoretical background.

One of the most studied manifestations of the illusion of knowing is a hard-easy effect that concerns characteristics of the learning information such as task complexity and structure. Overconfidence is generally higher when a task is difficult, and is lower when a task is easy. When the level of performance is high, it is underestimated, but when it is low, it is generally overestimated. Calibration inaccuracy is influenced by unknown words, long and complex sentences, new information that is difficult to comprehend, etc.

Context of information, level of its interest, informality, usefulness, etc. also play important roles in metacognitive monitoring accuracy. Hacker, Bol, and Bahbahani (2008) found that higher levels of calibration are possible only in case of higher levels of contextual knowledge of the learned information. Current knowledge and heuristics of familiarity are strong barriers of metacognitive monitoring effectiveness and can result in the illusion of knowing as often after receiving information the belief that it was known before occurs (Metcalf, 1998).

The illusion of knowing can also occur because of the style and length of the information proposed, its ease of access, and additional general information (if available). According to Commander and Stanwyck (1997), the illusion of knowing is more dependent on shorter passages as longer passages of information, on contrary, can promote more accurate monitoring.

The illusion of knowing can be caused by learning motivation that relates to general confidence and reflexivity. People who consider external factors as the reasons for their achievements (task performance or diploma orientation) demonstrate overconfidence, whereas those who are guided by internal motives such as self-orientation and skills-development tend towards underconfidence. According to Pallier et al. (2002), Jee, Wiley, and Griffin (2006), people with low levels of knowledge tend to overconfidence. Miller and Geraci (2011) found that badly studied students with lower intellectual levels suffer greatly as they do not know the needed material and are also unaware of their not knowing.

To find possible causes of the illusion of knowing there is a need to study cognitive characteristics and academic achievements of university students. According to a number of studies (Savin & Fomin, 2013, etc.), people with higher levels of knowledge tend towards lesser overconfidence, whereas unsuccessful students learn material quickly and unthoughtfully, do not stop on problematic aspects, do not overthink the misunderstood parts, etc. that can lead to the illusion of knowing.

Metacognitive characteristics (metacognitive knowledge, activity, and awareness) as potential causes of the illusion of knowing should also be taken into account. A method of metacognitive monitoring knowledge estimation proposed by Tobias and Everson (1996) does not only allow to estimate metacognitive knowledge in comparison with cognitive knowledge (knowledge about metacognitive activity skills), but also verifies correctness of this estimation. People are estimated to be aware of metacognitive activity through practical tasks and through checking the correctness of their judgements. Metacognitive activity profiles consist of such types as 'one claims to know and gets right on test' and 'one claims not to know and gets wrong on test' that indicate metacognitive knowledge; whereas such notions as 'one claims to know but gets wrong on test' and 'one claims not to know but gets right on test' can indicate knowledge lack.

To estimate the reasons for the illusion of knowing in metacognitive monitoring accuracy one should take into account individual psychological characteristics such as gender differences and age peculiarities. Some rare studies show that women tend towards more accurate confidence rather than men (Pulford, 1996). Age peculiarities are also studied not thoroughly.

Procedure of the Research, Methods and Test Materials

The study tries to contribute to better understanding of the illusion of knowing in metacognitive monitoring. The research is centred in a precise theoretical framework of the causes of the illusion of knowing in metacognitive monitoring of the learning activity of university students. In experiment we investigated the factors of metacognitive monitoring reliability such as the type of information proposed, and also personal, cognitive, metacognitive, and individual psychological characteristics of the participants. Moreover, we also aimed to describe the consequences of the illusion of knowing, and to specify some possible ways of annihilation of its negative impact on the learning activity of university students.

262 students of the National University of Ostroh Academy (Ukraine) (192 female and 70 male students, $M = 19,5$; $SD = 1,87$) participated in the

study voluntarily and for free. The participants were Ukrainian students of the university in their 1st to 5th year of study.

The study had two stages: diagnostic stage and laboratory experiment stage. At the diagnostic stage all the participants answered questions from the questionnaires dealing with psychological characteristics of students such as personal, cognitive, and metacognitive characteristics. In order to investigate influence of personal characteristics on the illusion of knowing we used a method of motivation diagnosis; a method of self-confidence diagnosis; a method of reflexivity diagnosis. To determine whether there are any causes of cognitive characteristics for the illusion of knowing we used a method of self-efficacy assessment; a method of the implicit theories diagnosis (Dvek's questionnaire) (we used a criterion of fixed/changeable intellect). In an attempt to find if there are any causes of the illusion of knowing achieved from metacognitive characteristics, we used a method of a diagnosis of metacognitive involvement (metacognitive awareness) in the learning activity; a method of a diagnosis of metacognitive knowledge and metacognitive activity. To study average distribution of equivalence and the highlighted characteristics a sample test was done (*see Pasichnyk, Kalamazh, & Avgustiuk, 2017; Avhustiuk, Pasichnyk, & Kalamazh, 2018*).

To determine the relations between the illusion of knowing and academic achievements overall results during semester were analyzed, and average marks of the participants were converted from a 100-scale to standard values of a 5-point scale (0–60 = 1 and 2 points – the worst results, 61–75 = 3 points – satisfactory level, 76–90 = 4 points – good level, 91–100 = 5 points – excellent level).

At the laboratory experiment stage 6 texts (of the scientific prose, the newspaper and the belletristic styles) (two of each type) of different length were presented. 18 statements and 18 pairs of words also served as a stimuli material. The information passages were presented in Ukrainian. All quantitative data were divided into nine groups according to task type: open-answer questions, questions with answers 'Yes'/'No'/'Do not know', and multiple-choice questions for texts, statements, and word pairs each.

The participants read the stimuli material, answered questions, performed prospective and retrospective metacognitive judgements of learning about confidence (JOLs and RCJs) and prospective and retrospective metacognitive judgements about the number of correct answers (aJOLs and aRCJs). The indicators of the illusion of knowing were defined with the help of calibration procedure. All the received data were processed by *IBM SPSS*

Statistics 20 and the calculations were done by *Excel*. Data were processed by means of ANOVA analysis, *T*-test, correlation coefficient of Goodman-Kruskal, Spearman rank of correlation index, etc. (for more detailed description see Pasichnyk, Kalamazh, & Avgustiuk, 2017; Avhustiuk, Pasichnyk, & Kalamazh, 2018).

Research Results and Discussion

The results showed that in aJOLs and aRCJs the proportion of those who overestimated the number of correctly performed tasks was significantly higher in comparison with those who showed underestimation. However, among those participants who underestimated the number of correctly performed tasks the indicators of the illusion of not knowing were the highest ($M_{aJOL} = -.37$; $SD = .41$, and $M_{aRCJ} = -.33$, $SD = .48$) ($p \leq .05$).

The illusion of knowing most frequently occurred in aJOLs (the results of 35,9 % of the participants). Before tasks performance among those participants who underestimated possible number of correctly performed tasks the degree of the illusion of not knowing was the highest ($M_{aJOL} = -.37$; $SD = .41$, $p = .05$). *T*-test for pair samples showed significant differences in rates of errors in metacognitive judgements between aJOLs and JOLs ($t(56) = 2,09$, $p \leq .05$), between aRCJs and RCJs ($t(56) = 2,23$, $p \leq .05$), and between JOLs and RCJs ($t(56) = 2,09$, $p \leq .05$). In RCJs and aRCJs metacognitive monitoring accuracy grew. Thus, the results state that those students who made mistakes in monitoring reduced the proportion of those who showed the illusion of knowing.

The highest levels of overconfidence were shown in the proposed statements ($M = 4,67$; $SD = 1,59$, $p = .00$). Dependence of the illusion of knowing on the styles of texts was also fixed. In learning the texts of the belletristic style students showed higher ratings of overconfidence ($M = 4,69$; $SD = .75$, $p = .04$) compared with the texts of the newspaper style ($M = 4,44$; $SD = 2$, $p = .05$) and the style of the scientific prose ($M = 4,43$; $SD = 2$, $p = .05$). Significantly higher levels of overconfidence in the correctness of the learned material were shown while learning larger texts ($M = 5,12$; $SD = .64$, $p = .04$) if to compare with smaller texts ($M = 3,5$; $SD = 1,88$, $p = .05$). In particular, students were more overconfident in their judgements while learning larger text of the belletristic style ($M = 4,69$; $SD = .75$, $p = .05$) than while learning larger texts of the scientific prose ($M = 4,43$; $SD = 2$, $p = .05$) and of the newspaper styles ($M = 4,44$; $SD = 1,8$, $p = .05$).

Students were more confident in the judgements of learning while answering multiple-choice questions ($M = 4,46$; $SD = 1,66$, $p = .03$), less

confident while answering open-answer questions ($M = 4,42$; $SD = 1,71$, $p = .05$), and showed the least levels of confidence in ‘Yes’/‘No’/‘Do not know’ questions ($M = 4,28$; $SD = 1,69$, $p = .03$). The results state that the illusion of knowing can be caused by the task type. Accuracy of tasks performance was highly overestimated and resulted in the illusion of knowing in multiple-choice questions for statements ($M_{O/U} = .27$; $SD = .74$, $p = .01$), and was the most accurate in metacognitive judgements of open-answer questions for texts ($M_{O/U} = .07$; $SD = .17$, $p = .00$) and ‘Yes’/‘No’/‘Do not know’ questions for texts ($M_{O/U} = .09$; $SD = .13$, $p = .00$).

There were also fixed correlations between self-confidence and the illusion of knowing in aRCJs ($r = .32$, $p = .05$) and RCJs ($r = .24$, $p = .05$). The participants with higher levels of reflexivity showed higher underconfidence ($M = -.74$; $SD = .27$, $p = .01$) compared to the middle and low reflexive students ($M = -.42$; $SD = .22$, $p = .01$, and $M = -.47$; $SD = .17$, $p = .01$). Nevertheless, there were not shown statistically significant differences of the average values of the illusion of knowing according to intellectual development.

It was found that the participants with low self-efficacy tended to demonstrate the illusion of knowing. The proportion of overconfident students in their aJOLs (37 %) and aRCJs (37,6 %) was significantly higher than the same proportion of underconfident students (10 % and 14,3 % respectively). Among the participants with lower levels of self-efficacy the proportion of underconfidence in JOLs was high (55 %), and the levels of the illusion of not knowing were also very high ($M = -.53$; $SD = .21$, $p = .01$).

There were found differences in terms of metacognitive knowledge between the illusion of knowing in aJOLs and aRCJs [$F(2, 56) = 3,38$; $p = .05$], and differences in terms of metacognitive activity between the illusion of knowing in aJOLs and aRCJs [$F(2, 56) = 2,79$; $p = .05$], as well in JOLs and RCJs [$F(2, 56) = 3,21$; $p = .039$]. Students with lower levels of metacognitive activity tended towards the illusion of knowing in all prospective and retrospective judgements of learning.

There was also found a direct correlation between the illusion of knowing in JOLs ($r_{JOL} = -.21$, $p = .05$) and RCJs ($r_{RCJ} = -.23$, $p = .01$) and metacognitive awareness. Before task performance there were found correlations between the illusion of knowing and metacognitive activity ($r_{aJOL} = -.18$, $p = .05$), between the illusion of knowing and metacognitive awareness ($r_{JOL} = -.21$, $p = .05$). The data showed correlations between the illusion of knowing and reflexivity in all prospective ($r = .21$, $p = .05$) and

retrospective metacognitive judgements of learning ($r = -.23, p = .01$). Average results of the illusion of knowing in metacognitive monitoring according to the chosen psychological characteristics are presented in table 1.

Table 1

The Illusion of Knowing In Metacognitive Monitoring

	aJOLs	aRCJs	JOLs	RCJs
	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>
Learning Motivation	HL(.25)(.19) ML(.25)(.2)	HL(.26)(.15)	HL(.27)(.3)	HL(.26)(.2)
Self-Confidence	ML(.26)(.17)	ML(.26)(.18)	ML(.3)(.21)	ML(.28)(.17)
Reflexivity	HL(.25)(.18) ML(.25)(.19) LL(.25)(.19)	ML(.27)(.13)	LL(.3)(.21)	HL(.3)(.2)
Implicit Theories of Intellect	ML(.26)(.13)	ML(.3)(.12)	ML(.3)(.31)	ML(.26)(.09)
Self-Efficacy	HL(.25)(.14) ML(.25)(.47)	HL(.27)(.09)	HL(.27)(.18) ML(.27)(.18)	HL(.28)(.11)
Metacognitive Knowledge	HL(.3)(.24)	HL(.29)(.14)	LL(.33)(.27)	HL(.28)(.37)
Metacognitive Activity	ML(.26)(.17)	HL(.25)(.22) ML(.25)(.23)	LL(.28)(.18)	LL(.28)(.1)
Metacognitive Awareness	ML(.28)(.16)	HL(.25)(.19)	HL(.3)(.19)	HL(.25)(.18)

Note. HL – ‘high level’, ML – ‘middle level’, LL – ‘low level’; $p \leq .05$.

There were not found statistically significant gender differences in the indicators of the illusion of knowing [$F(2, 56) = .013, p = .19$]. It can mean that the illusion of knowing is not caused by gender. Nevertheless, female students tended to show higher levels of overconfidence in all prospective and retrospective judgements of learning.

ANOVA analysis showed statistically significant differences in terms of age peculiarities between the indicators of the illusion of knowing in all judgements ($F_{aJOL}(2, 56) = 9,43; F_{aRCJ}(2, 56) = 13,03; F_{JOL}(2, 56) = 4,44; F_{RCJ}(2, 56) = 6,95$) ($p = .00$). It can mean that age influences the illusion of knowing in all metacognitive judgements. Younger participants (17–19-years-old) tended towards overconfidence ($M = .06; SD = .19, p = .00$), and the participants of the age group of 20–22 tended towards underconfidence ($M = -.41; SD = .47, p = .00$). Results also showed that the illusion of knowing can be caused by lower academic achievements.

The findings demonstrate that the illusion of knowing can be caused by different characteristics and can take place in all types of metacognitive judgements, but is more evident in prospective judgements, and can depend on the type of information, its length and style, task type, etc.

The illusion of knowing can appear in the statements learning. This can be explained by the influence of logical context of the learned information and also by the hard-easy effect.

Information length and style can also lead to the illusion of knowing. Our experiment showed that the illusion of knowing was higher in larger texts, especially of the belletristic style. The reason for this may be the influence of task performance experience on metacognitive judgements because to learn larger passages of information the participants needed to show more efforts and were under the influence of curiosity, emotional effect, the hard-easy effect, etc.

We also found that the illusion of knowing can be caused by task type. Thus, our results fixed occurrence of overconfidence in multiple-choice questions.

The results showed no significant differences between the illusion of knowing and intellectual development. But the analyses of the inner-group differences made it possible to argue that in terms of changeable intellect the levels of the illusion of knowing in aJOLs and aRCJs were notably higher. It can mean that the level of the illusion of knowing is independent of changeable intellect, and thus implicit theories of intellect do not significantly affect the subjective confidence in the accuracy of metacognitive judgments.

Middle and low reflexive participants showed overconfidence. But significant differences between the illusion of knowing and self-efficacy were not found. On contrary, the participants with lower levels of self-efficacy tended towards the illusion of not knowing.

Our study collaborates with previous results (Kroll & Ford, 1992; Hacker, Bol, & Bahbahani, 2008, etc.) that state that the illusion of knowing can be caused by external motivation, whereas internal motives can lead to underconfidence.

Results showed that the illusion of knowing was common for students with lower academic achievements. The results correlate with the scientific data, according to which there is an interchangeable correlation between 'the more successful people are, the less confident they are in their knowledge'. A number of studies showed that people with higher levels of

knowledge are less likely to overconfidence (Kruger & Dunning, 1999; Pallier et al., 2002; Dunning et al., 2003; Jee, Wiley, & Griffin, 2006; Miller & Geraci, 2011, etc.).

In the scientific literature the attention is mainly paid to the correlations between intellect, academic achievements, motivation, and gender differences. According to McCarty and Siber (Pulford, 1996), women are less inclined to the occurrence of overconfidence than men. Our analyses showed slightly opposite results.

Age differences in the manifestation of the illusion of knowing were not observed. Nevertheless, it was found that the illusion of knowing is more typical for younger students, especially for those with lower levels of academic achievements. Possible explanation is that students with lower levels of knowledge have more difficulties with the accuracy of metacognitive judgements and cannot distinguish between questions answered correctly or incorrectly.

Our study also provides further evidence for the consequences of the illusion of knowing in metacognitive monitoring. The phenomenon can be a significant obstacle to the effectiveness of the learning activity as ignorance when important information was missed often ables to slow down the process of learning.

Tobias and Everson (1996) suggested that in the situations when students have to learn larger passages of new material, those who are able to distinguish between the learned and unlearned information have a significant advantage because they can just overlook already learned material and devote more time and energy to learn new material. Conversely, those students who are not inclined to highly accurate monitoring processes are likely to spend time and efforts less effectively. They usually spend time studying information that is already known but remains unknown for them. Thus, they can have more difficulties in learning new information. Therefore, an important role is played by correction of monitoring efficiency of students' knowledge. This happens because students need to have an ability to distinguish between what they think they know and what they think they do not know, and also between what they know and what they really do not know.

Since knowledge overestimation remains a common problem in metacognitive monitoring reliability, the illusion of knowing also acts as a conceptual problem in the learning process. Common adverse effects of the illusion of knowing in the learning activity of university students can

be: ineffective self-esteem; metacognitive incompetence towards own knowledge, skills, and strategies of learning; failure in an attempt to thoroughly evaluate the level of actual understanding of the learned material; inability to distinguish between the illusory and pure knowledge; inefficient allocation of time and attention; lack of efforts to find a correct answer, or, conversely, effortless expenses of skills usage, etc.

On the basis of the summarised results of the theoretical and experimental researches, a number of the basic theoretical concepts of psychological and pedagogical conditions of the illusion of knowing annihilation, and thus metacognitive monitoring optimization of the learning activity of university students can be proposed. Here are some of them: abstraction from already learned material, identification of problematic aspects, repetitive learning of information, feedback, self-analysis and self-report, thorough analysis of answers, sentence structure change, targetted training in task performance, postponed metacognitive judgements after tasks performance, evaluation of the learned information before metacognitive judgements of learning, self-questioning about knowledge accuracy.

Conclusion

To sum up, our work studies the illusion of knowing in metacognitive monitoring of the learning activity of university students. We have described some causes of the illusion of knowing, such as different types of information proposed, and also personal, cognitive, metacognitive, and individual psychological characteristics of the participants. We can assume that the results found in the study play an important role in the process of optimization of metacognitive monitoring in the university learning activity.

It is possible that some limitations could influence the results obtained. The cross-sectional data of the research were made in the form of the laboratory experiment, so further research should consider the dependence of the illusion of knowing on the highlighted characteristics in the context of a real learning process. Further researches of the illusion of knowing need to study different social groups, not only students as we did in our research. There is also a need to provide more detailed study of the factors of reliability of metacognitive monitoring and the illusory knowledge phenomenon.

Nevertheless, despite some limitations, this study makes it possible to better clarify the illusion of knowing in metacognitive monitoring. It currently highlights a number of possible causes of the phenomenon and shows its influence on metacognitive monitoring reliability.

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