DIFFERENT STRATEGIES FOR ASSESSING READING COMPREHENSION IN ADULTS. FROM ALPHA TO OMEGA

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Abstract

Comprehension constitutes the main purpose of reading, one of the most important human skills. Furthermore, reading and therefore comprehension are perplexing procedures, that are built through the interaction of the cognitive functions. Comprehension occurs in a cognitive and metacognitve level. Meta-comprehension indeed, constitutes an important interpretive factor of learning, especially in the field of text comprehension. The present review study attempts to emphasizes and interpret a variety of research protocols, which have as an ultimate goal text comprehension evaluation and improvement in adult population. Implications for integrating different comprehension-monitoring experimental designs to improve text comprehension in adults are discussed.

Keywords: adults, monitoring accuracy, text comprehension, reading process

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1. Introduction

Comprehension refers to conceiving the meaning of a subject, acting a significant role in reading process. It constitutes a prerequisite for the construction of knowledge by those involved in the learning procedure in all cognitive fields. This is a complex procedure, that happens in both a cognitive and a meta-cognitive level and requires activating the ability of integration between the informative data of the text and the reader's previous knowledge (Meneghetti, Carretti, & De Beni, 2006; Mills, D'Mello, & Kopp, 2015; Oakhill, 1993).

It is more than obvious that text comprehension constitutes the main purpose of reading, one of the most important skills. An important part of the academic performance is based on the ability of the reader in learning process to be able to retrieve information from the text during the reading process. Text comprehension requires the activation of different information presented in a text and synthesized them with the reader's prior knowledge (Chiang, Therriault, & Franks, 2010; Kuperberg & Jaeger, 2016; Oakhill, 1993). The most significant reader's task in the reading process is to understand the meaning by producing new informational schemas from existing data, as well as to fill in any information that is missing in order to build on the meaning of the text which have already read. The reader reaching the overall mental representation of the text integrates or rejects a set of information from his cognitive base as result of comparing the mental representation of the text with what he knew before (or didn't know) about the meaning of the text (Baekgaard & Serritzlew, 2016; Dabarera, Renandya, & Jun Zhang, 2014). In order for a text to be understood it is necessary for the reader to create a mental or situational model, a mental representation of the described relations presented in a text during reading process (Oakhill & Cain, 2004. Johnson-Laird, 1983; Kintsch, 1998; Kintsch & Kintsch, 2005; McNamara & Magliano, 2009; McNamara & Kendeou, 2011).

One of the most prominent theoretical models for describing the text comprehension process is the one suggested by Kintsch (1994, 1998). More specifically, the model emphasizes on three different levels of meaning representation. Each level performs distinct functions. In the first level (surface level) the structural characteristics of the vocabulary units and sentence sets as well as the linguistic relations between them are being coded. In the next level the syntactic and semantic representation of the information of the material under study accomplishes. More specifically, the semantic sentences are connected each other so that a micro structure of the text is built, namely the semantic units are derived not only from the syntactic relations but also from the cohesion relations that emerge among the semantic sentences. Finally, in the last level (situational) an internal acquisition of the meaning is accomplished, resulting in a deeper understanding. In particular, the information that exist on the text, are linked through the inferences drawn with the reader's previous knowledge and experiences, in order to create a situational model. In the first two levels the words and the ideas of the text are represented in memory, whereas in the third level the relations between the presented

informative data and the conclusions drawn through the actuarial and critical thinking processes are the ones represented (see. Griffin, Wiley, & Thiede, 2008).

Specifically, very quickly the interest of the researchers turned from the study of low-level processes (such as reading words, phonological awareness, decoding words) and their connection to the difficulties that are detected in comprehension (McNamara & Magliano, 2009; Oakhill, 1993) in the investigation of high-level processes (construction of the mental representation of the text's sentences, making connections with previous knowledge and experiences.

Part of the research impulse given in the study of text comprehension can be attributed to the fact that comprehension refers to the recognition of the textual structure in an organized semantic whole and not just in recognition of a series of words (Rapp, van den Broek, McMaster, Kendeou, & Espin, 2007). Thus, scholars gradually focused on investigating high-level processes and their relation to comprehension. In addition, the research data advocate in favor of the view that comprehension is affected in a greater degree than the decoding skill both from previous relative knowledge and from working memory and meta-cognitive monitoring skills during the reading procedure (Cain, Oakhill, & Bryant, 2004). Namely, the deeper comprehension of a text entails the meta-comprehension which is the awareness of the factors that impact the comprehension, the comprehension monitoring and the person's control of cognitive actions during the reading process (Therrien, Kirk, & Woods Groves, 2012).

Investigating the role of meta-comprehension is essential because meta-comprehension skills seem to be associated with the self-regulation of learning (Dunlosky & Thiede, 2004). In the case of reading the good reader seems to be the person who is able to follow the course of comprehension, to know when he has understood and when he has not understood a point of the text that he read, in order to intervene and regulate his learning (Magliano & Millis, 2003). Taking corrective measures leads self-regulation of learning resulting in higher performance (Thiede, Anderson, & Therriault, 2003; Winne, 2010). As the investigative bibliography for meta-comprehension is expanding, is confirmed by the studies so far that meta-comprehension constitutes an important interpretive factor for both academic performance, as well as text comprehension difficulties (i.e, Dunlosky & Hertzog, 2001; Kinnunen & Vauras, 1995; Maki, 1998).

The term meta-comprehension concerns the meta-cognition monitoring skill of the comprehension that is, the current awareness with regard to the degree of the textual structure comprehension (Winne, 2010). Two important comprehension monitoring skills are: a) evaluation, and b) regulation of comprehension. Evaluation refers to the person's skill to perceive how successfully the comprehension process progresses and if any obstacles exist in it. Accordingly, refers to person's skill to make appropriate decisions by applying proper strategies aiming to solve possible obstacles in the process of comprehension an under studying reading material (Vossing & Stamov-Roßnagel, 2016).

The thoroughly investigation of international literature indicates that the metacognitive skill of monitoring has traditionally analyzed by the errors' detection

method in adult population (Jackson & Balota, 2012; Shafto, 2010) and in children as well (Anderson & Beal, 1995; Hacker, 1997), while it has just recently started the study through experimental models measurement of accuracy the estimation of the monitoring comprehension level (Rawson, O'Neil, & Dunlosky, 2011; Roelle, Schmidt, Buchau, & Berthold, 2017).

A different research tradition in the field of comprehension is concerned the investigation of the factors that contribute to increasing accuracy in monitoring comprehension in adult population. The accuracy of monitoring describes the person's ability to accurately evaluate his level of comprehension (Anderson & Thiede, 2008; Chiang et al., 2010; Ozuru, Kurby, & McNamara, 2012). Monitoring accuracy reflects a high degree of relationship between the intended levels of comprehension and the actual performance in comprehension tasks. Accurate monitoring plays crucial role in the reading process, because triggers the onset of the material cognition processing and regulates the occupation time with it contributing in reading self-regulation (Dunlosky & Thiede, 2013; Hattie, 2013; Thiede, Dunlosky, Griffin, & Wiley, 2005).

Winne (2004) uses the term "*accuracy index of monitoring performance*" which relates to the extent to which the subjective assessment of performance in a project under consideration corresponds to the actual performance of the individual. The theoretical problem that has been developed regarding accuracy monitoring and meta comprehension led the researchers in the pursuit of experimental standards with the aim of improving the monitory accuracy initially in adult population and therefore the more efficient learning regulation (Thiede & Dunlosky, 1994). The usual experimental design which apply for the study of this phenomenon is to provide participants with written texts (narrative or essays) and then they asked to appreciate how well they believe that they understood the material which they read or evaluate their ability to answer questions related to the content of the texts (Moore, Lin-Agler, & Zabrucky, 2005). For the comprehension evaluation is also used the method of delayed metacognitive judgments. Participants are invited to read a text, to answer in comprehension questions and immediately next to evaluate how right they believe that they answered (Lin, Moore, & Zabrucky, 2001). The comparison of expected performance and actual performance reflects the extent to which a person undervalues, overestimates or accurately evaluates his level of comprehension (Schraw, 2009; Shamir, Mevarech, & Gida, 2009). Viewing the literature data we confirm that, on the one hand most studies examine the adult population and on the other hand the high monitoring accuracy seems to lead to self-regulation improvement which in turn leads in performance improvement (Dunlosky, Serra, Matvey, & Rawson, 2005; Nietfeld, Cao, & Osborne, 2006).

It is worth to be mentioned that the accurate monitoring of the comprehension level is important as it will instigate in activation of proper regulatory actions on the part of the individual in cases of difficulty or error tracking. The regulation is a crucial metacognitive skill and concerns the implementation of appropriate strategies aiming to overcome potential barriers to comprehension (Zimmerman & Martinez-Pons, 1988). In the field of reading intent to comprehension, the effective reader evaluates the quality of

processing but also its results expanding the new knowledge (Kinnunen et al., 2010; Veenman, vanHout – Wolters, & Afflerbach, 2006).

The present study attempts a thorough investigation of reading comprehension scope and in particular of the monitoring accuracy of the text comprehension, as determining factor which can differentiate the performance in text comprehension tasks through the mechanism of self-regulation. In addition, the present study presents a number of research traditions with different methodologies which have been designed and implemented with the aim to improve the monitoring accuracy in adult population. Indeed, the study of accuracy has recently created an increasing research interest as it appears to be observed in adults in a large extent "*illusion of understanding*". For this reason, scholars attempted to build experimental models to improve text comprehension through improving the accuracy of monitoring comprehension (Schraw, 2009).

The intensive investigation of the relevant literature data indicates that although most studies examine the adult population, mainly students, the finding of low level accuracy of comprehension monitoring is systematically presented (Lin & Zabrucky, 1998. McNamara, 2004; Thiede et al., 1994; Thiede et al., 2005). Given this finding, occurs an overall assessment of findings related to the accuracy of monitoring text comprehension with the introduction of experimental manipulations involving the execution of a variety of cognitive tasks, such as: a) the recall of a word list, b) the writing of general target-words, c) the writing of summary texts, d) the recall and writing of specific tested terms, e) the repetitive reading, f) the effect of using electronic devices and, g) the use of diagrams, photographs and letters with bold font.

2. Mnemonic tasks and monitoring accuracy

Within this framework, researchers gave a central role in accuracy monitoring performance in mnemonic tasks. In most cases experimental projects are either mere learning and recall word catalog tasks, or audio-visual memorization and recall stories tasks (viewing short films) and much less projects of text comprehension. In particular, most surveys emphasizing on monitoring accuracy are based on learning tasks with pairs of words associated by meaning from catalogs. Researchers ask participants to study word pair catalogs, while at the same time they inform them that during the examination the participants should, when they see one word, recall the word's pair which previously have memorized. Immediately after completing the learning process, the first word is presented and then the person is called to develop a predictive estimation (learning crisis) based on how confident they are recalling the word during the examination (Nelson & Dunlosky, 1991).

One of the first studies of accuracy of monitoring performance in mnemonic tasks was by Thiede and Dunlosky's (1994) research on psychology students. Specifically, the researchers were presenting on the computer screen pairs of words. The task of the participants was to identify whether the words that appeared each time on the computer screen belonged to the pair of words that they had learned earlier or recall the second

word, when previously the first word had been introduced. They introduced two conditions, the first concerned the immediate recall, and the second concerned the recall after delay. The participants had to appreciate their sense of certainty about the correctness of the recall or recognition of the requested words.

The findings revealed that the participants were less accurate when predicting sense of certainty was concerned with the recognition and not with the recall of the requested words. Similar are the findings Dunlosky and Hertzog, (2001), Hertzog, Price, and Dunlosky, (2008), Hertzog, Saylor, Fleece, and Dixon, (1994) who applied the above experimental model in adult population.

The main criticism that can be exerted on the findings of studies that mentioned above is that they focus solely on memorization and processing either word catalogs or memorizing images without heightened requirements for understanding and maintaining complex information. In addition, an overview of research findings reveals that when it works are very simplified (word list learning), the monitoring accuracy is high (for example, Benjamin, Bjork, & Schwartz, 1998; Howie & Roebers, 2007; Roebers, 2002).

3. Writing target key words and their impact on tracking accuracy text comprehension

Thiede, Anderson, and Therriault (2003) introduced the "*target key word*" (immediate recording and retrospective recording) as innovative cognitive task aimed at improving the ability to monitor text comprehension. The nature of the task requires the participant in the evaluation upon completion of the reading process to record five words on the computer which reflect the semantic content of the under study text. Six in total texts (scientific content) were provided. They were created two different conditions, the direct word recording condition and the condition of writing words after a delay. The presentation of all texts was made exclusively in a computer environment. The study's findings revealed that the performance of the participants' group of retrospective recording was higher in comparison to the immediate recording leading to higher appreciations. It is worth mentioning that this experimental model allows participants to link their relevant information of the text which they have stored in their memory with their prior knowledge enhancing thereby the accuracy of the comprehension monitoring. In this case, the search and the retrieval of the mnemonic traces is done by long-term memory (Dunlosky, Rawson, & Middleton, 2005).

Thiede and Anderson's (2003) research methodology follows the same pattern. They argue that individuals' ability to monitor their comprehension, is reflected in the accuracy of the evaluation. They introduced three conditions, the direct word record condition, the word record condition by delay and the condition of simple reading. Results have revealed a higher accuracy of monitoring text comprehension in group of words recording by delay. The scholars attributed the results of high accuracy monitoring of understanding in effect of repetitive reading, which leads to the familiarization with the conceptual content of the under examination material.

Similar is the experimental study of Thiede, Dunlosky, Griffin and Wiley (2005), who attempted to investigate the effect of the post-word writing to improve comprehension monitoring of a text. According to the findings of their study they form the view that writing words after a delay requires access to long-term storage with target to searching the information network concerning the general content of the material studied.

Attempting a critical evaluation of these experimental designs, researchers found that participants based their appreciations on two axes: to mnemonic signals during the evaluation procedure and to the easiness to activate them (Alexander, 2013). However, the deeper text comprehension should not only be based on mnemonic signals in relation to the current task, but in the ability to connect information with the reader's prior knowledge aiming to build a more general meaning. Very soon the scholars of the monitoring accuracy field were focused on designing new experimental models contributing to illuminate the complex web of monitoring accuracy text comprehension.

Subsequently, the findings of a series of experimental tests are presenting with goal to assess the monitoring text comprehension ability and its improvement by introducing a new cognitive task which includes the authoring of summary texts.

4. Authoring summary texts and their impact on monitoring accuracy

In a relatively recent study Anderson and Thiede (2008) used the experimental manipulation of authoring text summary. Three different condition have been designed: the condition of immediate recording of the summary text, the condition of the summary text recording in later time and the condition without summary recording. Five in total texts of scientific content were used via computer. The participants were called to write a brief summary about the semantic content of the text. After completing the writing of the summaries, the title of each text was displayed on the computer screen. The task required the participants to assess their judgment for learning about the content of each text.

The research results revealed that the summary recording team in later time led to more accurate metacognitive estimates towards text comprehension. The researchers attributed the findings to the fact that the summary recording in later time reflects the individual's ability to consciously seek and retrieve information from the long-term storage which have not weakened and concern the general conception and the semantic representation of each text which the participant has fully understood.

Similar conclusions were reached by Thiede, Griffin, Wiley, and Anderson (2010), who used analogous experimental model. The scholars conclude that despite the fact that the participants are led to more accurate metacognitive estimates however the active search and the conscious retrieval of the requested information does not appear enough for the overall positive assessment of reading comprehension. In addition, it is found that the adult learning experience is not sufficient to lead to higher estimates of the monitoring comprehension text accuracy.

It is ascertained that the summary text authoring and the target-word recording are two cognitive tasks which essentially require easy access to information about the content of a text (Thiede et al., 2003). The above investigations are therefore focused on the active search and requested information ability from mnemonic storage and not from the connection of all information at the aiming of the hierarchical semantic representation of a text.

Following are findings from experimental studies which investigate the effect of recall and recording of specialized concepts (terms) with the ultimate goal the study of monitoring text comprehension capability.

5. Specialized concepts recording and their impact on monitoring accuracy

Dunlosky Serra, Matvey, and Rawson (2005) first introduced recording specialized concepts (terms). Texts scientific style were provided for the purpose of the research in an adult population. Each text contained 4 different terms presented in capital letters during reading. There were two conditions: the condition of predictability and the ex post evaluation of certainty feeling and the condition without predictability or ex post metacognitive evaluation. During reading of each text was inserted 4 different terms (with capital letters) and after followed a definition which explained conceptually each probationary term. After the presentation of each term followed the definition of each target concept. The task specified for the participants to memorize the referred term each time and then record in the computer the conceptual clarification of the presented term. After each text followed the assessment of the certainty feeling about the performance in the current project.

The results revealed that the evaluation of monitoring text comprehension accuracy did not seem to differ in the two different conditions. That is, the assessment of the reported feeling of certainty that it was related to the whole text did not seem to outweigh the metacognitive appreciation which concerned specialized terms.

Rawson and Dunlosky's (2007) research is also in line with a similar viewpoint. They applied the above experimental design to psychology students in order to study the accuracy of monitoring text comprehension. Participants did not score higher estimates of metacognitive monitoring.

However, it should be noted, that the withdrawal of specialized terms relates more to the ability to active process and store information in the mnemonic storage and less the process of reading comprehension which is the result of the mental process of combining all information in a meaningful representation contained in a reading material. For this reason, the researchers have quickly turned to designing new experiments standards to improve the accuracy of monitoring text comprehension.

6. Re-reading strategy and monitoring

Rawson and Dunlosky (2000) first introduced re-reading as experimental manipulation to improve monitoring text comprehension capability in a material under study. For the purpose of the research the study population was divided into two groups: simple reading group and re-reading group. Texts were provided (information type) in a computing environment. After the presentation of each text was followed a predictive assessment of the feeling of certainty on the correctness of the answers to the comprehension questions that will they followed. Then after the presentation of all texts, the text comprehension questions were displayed on the computer screen. The researchers found that the estimates of certainty in re- reading condition was more accurate than simple reading condition. The researchers estimate that re-reading leads to familiarizing the conceptual structure of the studied material, resulting in a more efficient text comprehension and higher accuracy.

In a similar context, Griffin Wiley and Thiede, (2008) estimated that the improvement of text comprehension monitoring can be achieved by the effect of re-reading strategy. In parallel in re-reading condition the predictive or the ex-post appreciations of certainty feeling were more accurate than the participants' appreciations in simple reading condition.

The effect of re-reading strategy on monitoring accuracy improvement was investigated by Chiang, Therriault and Franks (2010) and by Dunlosky and Rawson, (2005) with a parallel experimental design in student population. They argue that re-reading strategy can enhance the reader who has difficulties in text comprehension due to frequent disruptions during processing of the under study material, to use more effort to understand the text's points that cause a division in comprehension. The researchers estimate that this manipulation helps in better comprehension of the individual parts of the text aiming in monitoring comprehension without disruptions in order to improve the monitoring capability of an understudy reading task.

7. The use of diagrams, photographs and electronic devices

Serra and Dunlosky (2010) attempted to study the effect of use diagrams and photographic material to the monitoring comprehension accuracy. For the needs of the research was examined student population. Three conditions were created. In the first condition the participants they read a text (scientific content) that was accompanied by charts, in order to the better comprehension and creation of a coherent, semantic representation of the text question. Immediately after the text reading followed the learning evaluation regarding the text's content. In the second condition the participants read a text which was accompanied by photographic material, aiming to the enhancement of the overall meaningful representation of the textual kind. In the third condition the text's study was not accompanied by any supervisory material. Results revealed that the performance of the participants of the first two conditions (condition

with diagram use and with photographic material) didn't seem to excel the performance of the participants in the condition without accompanying material.

Similar is the research by Jaeger and Wiley (2014) who used diagrams and pictures to improve the participant's performance, which will lead to an increase in monitoring accuracy. However, the results showed that the use of diagrams and photos did not appear to result in high monitoring accuracy of text comprehension.

Sanchez and Jaeger (2014) investigated the effect of ease of conquest meaning in assessing comprehension ability. In particular, two conditions have been created for the purpose of research, the condition of reading of a clear text in a computer environment and the condition which included a very indistinct text to reading. Results revealed a negative correlation between the time of a text reading and the monitoring comprehension accuracy. Specifically, as grew reading time of a text (significantly in the second condition) as monitoring accuracy was reduced.

A possible interpretation of the above result could be considered as lack of familiarity of participants with the use of diagrams or the reading of indistinct texts, possibly effects on the performance which in turn has a decisive influence on the monitoring comprehension accuracy. In addition, at this point it can be mentioned that readers seem to find difficult to lead in reasonable conclusions by using pictures or diagrams.

Norman and Furnes (2016) studied whether the learning environment (computational) can influence the evaluation of monitoring ability of understanding. Three different conditions were designed for the research purpose: the text reading condition in protocol, the reading condition on computer and the text reading condition on a small laptop. Scientific texts were provided and a predictive assessment of the feeling of certainty about the participants' response to the questions was also performed. Results indicated that the performance of the participants across the three different conditions did not appear to vary significantly. The finding of low monitoring comprehension accuracy was consistent across all three conditions. One possible interpretation could be the size of the texts. It seems that monitoring accuracy is also influenced by extent (range of words or sentences) of a teaching material under study (Jaeger & Wiley, 2014. McNamara, 2001. Reutzel Smith, & Fawson, 2005. Saenz & Fuchs, 2002).

8. Critical evaluation – Conclusions

In conclusion, the present theoretical overview focusing on analysis a number of research studies, that use different experimental methods/ designs aiming to improve monitoring text comprehension accuracy in adults.

The contribution of this review study in theoretical level is to provide empirical data on competence of monitoring text comprehension accuracy in adult population. Investigating the results of the above correlational studies was found that text comprehension capacity was related to research measurements in adult populations and

specifically to students. The findings refer to the understanding of demanding texts and the predictive or the ex post appreciation of monitoring the text comprehension ability. An important criticism that could be exerted in the above studies, is the fact that the participants were quite effective readers. Experienced readers seem to have the ability to do corrective actions, when semantic gaps occur (Moore et al., 2005; Shiu, & Chen, 2013).

However, it is evident that in all the above mentioned studies the finding of low or "poor" accuracy in monitoring text comprehension in adult population is systematic and repetitive. One possible interpretation can be attributed to the fact that inaccurate monitoring is a result of activation and implementation, while engaging with one cognitive task, invalid signals (see Koriat, 2012. Vorstious, Radach, Mayer, & Lonigan, 2013). In particular, it seems that the evaluation of metacognitive emotions is the result of utilizing the mnemonic signals.

Such signals may be: (a) competence of processing of the under study element, b) the familiar (novel) of the signal used for mnemonic recovery, c) the ease with which the person accesses the requested information. The use these signals may be due to inability to access the appropriate signals but also in the inability to select these signals (Kolić-Vehovec, Zubković, & Pahljina- Reinic, 2014). In addition, these signals are associated with the cognitive state in a person's long-term memory, as well as with an attempt by the reader to retrieve the required knowledge, at the time he makes his assessment (Thiede, Redford, Wiley, & Griffin, 2017).

It is worth mentioning that the experimental manipulations which are designed until today, aim to improve the access to appropriate signals, with purpose to drive the involved persons in learning process to more precise estimates. However, no research so far has been able to present important findings that lead to improvement in monitoring text comprehension accuracy in adult population, except for studies on the experimental manipulation of re-reading. More specifically, the process of connection of all different information in a hierarchical meaningful representation during reading a text seems to be improved by re-reading strategy (Thiede et al., 2017). In addition, it is found that except for cognitive performance improvement the re-reading strategy can also lead to improvement at the metacognitive level, such as is reflected by the highest metacognitive ratings (Stolp & Zabrusky, 2017).

An important ascertainment of this review study is the fact that accurate monitoring seems to be an important component in, as it may lead reader to the activation of appropriate adjustment strategies in cases of detection of semantic gaps or errors in order to correct any observed problems in comprehension.

One general conclusion that can be drawn from the above studies is that re-reading strategy can lead to conquest more coherent meaning representations, resulting in the most accurate assessment of the ability to monitor text comprehension. Concerns about a task that involves linking the information of a text between their, as well as connecting the meaning whole with the reader's prior knowledge (Dunlosly et al., 2005; Maki et al., 2005; Rawson et al., 2000). Furthermore, a series of studies concerning the effect of re-

reading process appear to present systematic findings of improving the monitoring accuracy in adult population.

It seems that re-reading strategy may form the basis for developing a new diagnostic tool for detection and recovery in possible difficulties in language comprehension. Future investigation on the topic could also help to more effective treatment of reading difficulties in the school population. Based on the research findings so far it would be interesting to see if re-reading can lead to more complete texts representations and more accurate metacognitive judgments resulting in the possibility to separate the readers into students with low or high learning profile respectively. Future investigation of this field will allow for clarification and documentation of the relationship between the ability of monitoring text comprehension and improving its accuracy in different school age groups, setting them bases for creating targeted intervention protocols aiming in enhancement of cognitive and metacognitive performance.

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