Memory Formation and its Importance in Study

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ABSTRACT

Memory formation is a study that examines patterns in neural activity that can help determine development in the central cognitive system. Memories play a key role in development as children go from infancy through adolescence and teachers need to study the subject to help aid in the development. In the research paper, I focused on three questions: why is working memory so important for childhood learning and education, how do working memory difficulties manifest in children, and what can be done for memory capacity to improve? Answers to these questions lie in various case studies done by different researchers in which they all shed light on how memories influence the developmental stage in students and they are used in the research paper to prove the importance of the study.

Keywords: Memory-formation, learning, cognitive processes, visuospatial information.

Subject: Psychology

INTRODUCTION

Memories are collections of information and experiences one stores in their mind. They are superior in both logical and intellectual cognitive processes and are essential to one's life, especially for students whose minds are at an age where development is at its fullest. A field of study called memory formation contains information on neural activity patterns and how specific actions can provide a long-lasting and even permanent change to one's memory (Johnson, 2010). Understanding how the brain functions and how memory is stored greatly benefits students as they take many standardized tests and exams - learning how to keep the information being studied and making it into a long-term memory will be an advantage as they progress into a higher level of study. Memory formation is a crucial topic for teachers to study to make the student's learning process more efficient and everlasting.

Why is working memory so important for childhood learning and education?
Childhood learning and education have been studied for decades, and one of the most important factors in enhancing the area of study is memory formation. The speed of processing information determines the speed of the long-memory retrieval rate (Wood et al., 1998). Long-term memory plays a big role in education and an increase in its knowledge base provides a better framework for bigger storage of verbal and visuospatial information. It provides students with improvements in the use of memory strategies with the expanding knowledge base as they undergo maturity and are exposed to more information and experiences (Wood et al., 1998). Additionally, increasing the quality of working memory ability is proven by researchers to be a strong predictor for success in areas of reading, spelling, and mathematics (Alloway, 2008; Alloway & Alloway 2010). Teachers must understand how working memory operates so that they can help enhance these skills in their students. The study has already made a great influence on classroom activities such as focusing and completing tasks (Gathercole & Alloway 2008; Holmes & Gathercole 2014); therefore, teachers should study memory formation to be aware of how they could enhance the quality of their classrooms and create strategic classroom management.

How do working memory difficulties in manifest in children?
Students with low memory capacities tend to mentally wander away from the cognitive tasks and this is identified as attention problems (Alloway,2008; Kane, Brown, McVay et al 2007). These types of students have an overload of working memory that cannot retain information needed to complete an activity they are asked to complete. The behaviors can be shown when they abandon tasks and fail to follow instructions given by the teachers. When compared with students with good working memories, students with poor working memory struggle with multi-tasking where

simultaneous activities demand a high level of cognitive work; for example, listening to a lecture and writing notes at the same time (Gathercole, Lamont & Alloway, 2006). Memory difficulty in instances such as losing vital information or skills from important academic fields of study, not being able to refresh new information, not being able to retrieve information from long-term memory, and utilizing relevant information in a particular subject in academics (Alloway 2006, 2009; Baddeley, 2003; Gathercole & Pickering, 2000; 2003). These difficulties are more likely to surface in students who need special education programs such as those who have attention-deficit/hyperactivity disorder (ADHD), autistic spectrum disorders (ASD), developmental coordination disorder, schizophrenia, dyslexia, and much more (Pickering & Gathercole, 2001; Alloway, Gathercole, Kirkwood & Elliott, 2009; Pickering, 2006; Rajendran, 2009; Sabol & Pianta, 2012). These students with working memory difficulties are relatively common in academic classrooms globally and are at risk of poor academic progress if their difficulties are not addressed (Alloway et al., 2009; Sabol & Pianta 2012). Teachers must take responsibility for creating working memory intervention programs to help those students in need.

What can be done for memory capacity to improve?
Students may try hard at school but still struggle to learn - this is because of the limitations of the memory storage capacity; it is between one and a half and six parts of information, depending on the student's age and modality (Baddeley, 2003; Cowan, 2001; Oberauer, 2005). These limits are what constrain cognitive tasks; therefore, students with greater spans of memory capacity typically perform better overall than individuals with lesser capacity. These capacities can be improved and strengthened in several ways, all of which involve different classroom activities and training sessions (Henry, Messer & Nash 2014; Holmes & Gathercole, 2014; Klingberg, Fernell, Olesen et al., 2005; Klingberg, Forssberg & Westerberg 2002; Minear & Shah, 2006). To improve working memory, there are various factors to consider. Firstly, the duration of the training sessions is important. According to a 2012 study done by researchers, effective programs that are time-intensive such as comprising 30-40 minutes five times a week for at least five weeks are the most effective and benefit the students the most (Shipstead, Hicks & Engle, 2012). Another factor that should be considered is the need for a teacher to be committed to the training session taking place and have to be constantly monitoring the progress of the student. Lastly, the difficulty level of the training tasks needs to be regularly adaptive to match the child's capabilities to motivate and encourage participation from the student. The process of improving memory capacity involves the teaching of memory strategies (St Clair-Thompson et al, 2010, p205). Strategies include visual and verbal images which help to organize material and connect thoughts in building bigger ideas to form a coherent framework, creating a link with long-term memory (Bjorkland & Douglas, 1997; Ericsson & Kintsch, 1995). Teachers must study memory formation to provide their students with the care they need.

CONCLUSION

A student may be trying hard at school but still struggle to learn. Limitations in working memory capacity negatively influence cognition, development, and learning processes - they also impair students' abilities to extract information and learn skills that later ultimately form the basis for various school subjects (Cowan, 2014). The paper emphasizes the importance of how teachers should study memory formation to provide their students with the best learning experiences - I conclude on a positive note that working memory capacities can be improved when addressed with targeted training sessions. However, it is important to note that a teacher's commitment level and level of knowledge in the area of study determine whether a student can improve upon their memory formation or not. Teachers need to start exploring ways to apply the research to creating working memory intervention programs.

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