Long-Term Memory Problems *in* Children *and* Adolescents

ASSESSMENT, INTERVENTION, AND EFFECTIVE INSTRUCTION

Milton J. Dehn

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Assessment, Intervention, and Effective Instruction

MILTON J. DEHN

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Long-Term Memory Problems in Children and Adolescents

For my children, Sonya, Alisha, Ted, and Amber.
May the good memories we share last a lifetime.

Foreword

Long-term memory plays a crucial role in the formation and maintenance of our personal identity. Recalling the name of our first-grade teacher or a second cousin, remembering where we went on vacation the past summer, or remembering our first kiss are all memories of past personal experiences. Memories provide us a frame of reference based on experience and help shape our personalities. Long-term memory also includes over-learned and automatic daily activities such as remembering how to brush your teeth or drive to work. And finally, long-term memory includes our encyclopedic knowledge of information such as who the first president was or how many days there are in a calendar year.

We often take for granted the sophisticated neurological system within the brain that is required to make long-term memory a seamless process when our ability to form, store, and retrieve long-term memories is intact. However, when memory systems become impaired or disrupted there can be devastating effects on the acquisition of new learning or the retrieval of previously stored information. Dr. Dehn's book will provide clinicians and educators a useful and timely guide on how to identify and treat memory impairments.

In this book, Dr. Dehn provides the reader with a framework of how long-term memory relates to other types of memory (e.g., short-term memory, working memory, etc.). He has also discussed the subcomponents of long-term memory and how they relate to academic achievement. Dr. Dehn reviews what is known about the neuroanatomy of how memories are formed, the developmental trajectory of memory and learning, and the common types of memory dysfunction. An important part of this book is the chapter on recognizing the risk factors that can lead to long-term memory impairments. If a memory dysfunction is suspected, it is important to pick the proper assessment instrument to confirm the presence or absence of the memory difficulties. Dr. Dehn provides a concise review of the subcomponents of long-term memory that should be assessed and reviews the major standardized instruments that assess memory and learning.

Clinical practitioners and educators have a wide variety of assessment instruments designed to assess memory and learning, many of which are theoretically based and psychometrically sound. However, the identification of memory and learning deficits cannot be the end point. Once a memory deficit has been identified,

educators need guidance on what evidence-based intervention strategies are readily available. Assessment must be linked to prescriptive intervention. Dr. Dehn provides a quality review of educational interventions designed to improve memory functions. Finally, Dr. Dehn presents several case study examples that illustrate how memory can be assessed and what interventions can be linked to the results of the assessment.

Long-Term Memory Problems in Children and Adolescents: Assessment, Intervention, and Effective Instruction by Milton Dehn will be a valuable resource for psychologists and educators who work with children or adolescents who are having difficulties with memory and learning. Translating theory and research into practice is a talent that Dr. Dehn possesses, and we will benefit from his professional skills. This book will be a useful addition to Dr. Dehn's other book, *Working Memory and Academic Learning: Assessment and Intervention* (2008), published by John Wiley and Sons, Inc.

Daniel C. Miller, Ph.D.,
ABPP, ABSNP, NCSP

Preface

One day when I was reading an article about recently discovered cases of developmental amnesia (a rare condition without identified cause in which children have extreme difficulty remembering), I was reminded of students with severe learning disabilities whom I had often encountered during my years of work as a school psychologist. It struck me that I had been missing something when I evaluated those students and made recommendations for their educational programs, and I began to wonder how many other children with academic learning and performance problems actually had underlying memory impairments. When I worked in the schools, I, like most school psychologists, seldom assessed students' long-term memory functions. In fact, I had never been trained to do so, probably because there were no long-term memory batteries for children in existence when I was in graduate school. As I switched to private practice, I began paying more attention to the possibility of memory problems when children were brought in for evaluations and tutoring. When I administered memory scales to these children, I was astounded to discover that about half of children with significant learning problems had deficits in working memory and that a sizable number also had impairments in long-term memory. I felt for these children. So often, their poor academic performance had been attributed to everything but neurologically based memory problems. Furthermore, those who were trying to help them were neglecting the memory problems.

With all of the resources our culture invests in the education of children and adolescents, I find it incredible that educators, parents, psychologists, and everyone else involved in the education and psychology of youth do not pay more attention to the most important variable in the learning equation—memory. Obviously, learning and memory go together; one cannot exist without the other. Yet, initial learning does not guarantee long-term retention and recall. Some students who learn easily also forget quickly, while others who struggle with learning retain the information well once it reaches long-term memory. Children and adolescents who forget too much or who struggle with learning because of memory problems are not difficult to understand or to help. Adults who want to understand and help can begin by learning more about memory. Books and research articles on memory from the fields of neuroscience, neuropsychology, cognitive psychology, and educational psychology

are abundant and readily available. The applied science also exists. We know how to help children learn and remember more effectively. For example, one approach involves teaching strategies that improve encoding and retrieval. If what is known about memory functions was consistently applied in the classroom and everyday life, learning and memory would be enhanced, and wasted effort and frustration with learning would be reduced.

Perhaps scant attention has been paid to memory assessment, intervention, and memory-enhancing instruction because of the pervasive belief that memory impairments in youth are so rare. Everyone knows that children and adolescents who have experienced a traumatic brain injury are likely to have persistent memory problems that will make learning a challenge. But what everyone doesn't know is that there are many other children who fail to realize their academic potential because they have memory dysfunctions or because they have not learned how to effectively utilize their memory capabilities. How many? There's almost no hard data to answer that question. One study in the United Kingdom found that up to 5.9% of normal, elementary-age children had specific long-term memory difficulties (Temple & Richardson, 2006). Given that approximately one quarter of K-12 students struggle with academic learning and perhaps half of them have underlying memory problems, I estimate that as many as 10 to 12% of students have long-term memory impairments or don't know how to effectively use their memory abilities. Also, the large numbers of children with disorders and health conditions, such as diabetes, who are at-risk for long-term memory problems, is undeniable (see Chapter 4). Whatever the exact figure, it is evident to me that we are failing to identify and serve a population of children who are failing to achieve because of underlying memory problems. How could we be missing so many children with memory impairments? The answer is that we and the students themselves misattribute the behaviors and problems to factors such as motivation or low average intelligence. The situation is similar to Attention Deficit Hyperactivity Disorder (ADHD). We were unaware of the existence of ADHD in so many children until we learned what it was and how to diagnose it. Prior to "discovering" ADHD, we misattributed the behaviors and problems it causes.

This book is not solely about the children and adolescents with diagnosable memory disorders or severe memory dysfunctions. Rather, this book is primarily about the large numbers of children and adolescents of school age who have mild to moderate difficulties with one or more aspects of long-term memory. Although the memory difficulties of the majority of these students go unrecognized, their memory challenges often impede their academic learning and the long-term retention of knowledge that they will need throughout their lives. In addition to those students who have neurologically based memory impairments, there are many other students who are not realizing their scholastic potential because they have not discovered or learned how to use effective memory strategies and mnemonics. Often these students are naïve in regards to their memory functions and don't understand how to regulate

them. A minimal amount of metamemory and strategy instruction may be all that is necessary to improve their retention and recall.

I have written this book so that those adults who educate and work with youth can learn more about identifying, helping, and educating the memory-impaired children and adolescents that we so often overlook. This book is written for school psychologists, clinical psychologists, neuropsychologists, special educators, classroom teachers, and related professionals who teach and work with children and adolescents. Although the school environment is emphasized in this text (as it is where children and adolescents spend most of their daytime hours), the information also can be applied in medical and private-practice settings. In this book I have mainly attempted to: (a) describe the various memory systems and processes; (b) explain how memory works at the neurological level; (c) interpret memory research; (d) identify the disorders and conditions that put children at-risk for memory problems; (e) emphasize the importance of metamemory development and the acquisition of effective memory strategies; (f) structure selective, cross-battery testing of memory so that memory assessment is comprehensive but efficient; (g) explain how to interpret results from various memory scales; (h) review contemporary memory scales that are designed for children and adolescents; (i) apply interventions to school settings; and (j) encourage educators to adopt more memory-enhancing instructional practices (see Chapter 1 for an overview of each chapter). For those who will pursue memory assessment, intervention, and instruction, this book is intended to be a resource and reference. Those who read and apply the information in this book will acquire enough expertise in long-term memory functions to effectively identify and help children and adolescents with memory problems.

Acknowledgments

I am indebted to my soul mate and intellectual partner, Paula A. Dehn, whose ideas, encouragement, and support made this book a reality. I wish to thank Benjamin R. Burns for gathering the literature, editing the manuscript, and providing feedback from a practitioner's viewpoint. I am also grateful to Joci Newton for providing feedback on chapters.

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CHAPTER 1 Introduction and Overview

Memory is an unique psychological construct and cognitive function in that almost everyone is interested in or concerned about his or her memory at some point in life. Nearly every person, even a 4-year-old child, has a concept of memory and an awareness of how his or her memory functions. Almost everyone knows that short-term memory is limited in capacity and duration, that long-term memory has an immense capacity, and that memories can last for a lifetime. Even a young child knows that people quickly forget most information and that there are strategies that help memories endure. Nearly everyone also understands that memory is necessary for learning to occur and that personal memories define each individual. Yet, most children have misconceptions about memory and how it functions, misconceptions that can be detrimental to learning. For example, many children erroneously believe that the intention to remember something will increase the probability of later retrieval or that delayed recall will be just as strong as immediate recall. Similarly, there are disagreements about memory structure and functions among researchers and practitioners who are concerned with human memory. For example, there has been an ongoing dispute about how memories become solidified through the process of consolidation. Most of the discord arises from the fact that memory is extremely complex, consisting of several systems, with each system serving different purposes and incorporating somewhat different cognitive processes (Tulving, 1985). Indeed, memory is not a single homogenous entity but a composition of many distinct interacting brain systems (Emilien, Durlach, Antoniadis, Van Der Linden, & Maloteaux, 2004). It is only recently that neuroscientists and other researchers have begun to unravel the incredibly sophisticated mental function known as memory.

Driven by advances in neuroscience and brain imaging, the past 20 years has seen a resurgence of research on the memory functions of children and adolescents. Although many of the contemporary investigations have focused on working memory (see Dehn, 2008), a sizable portion concern long-term memory systems and processes and how they relate to academic learning. The subjects of these studies are no longer limited to children with severe acquired brain injuries. A variety of at-risk populations (see Chapter 4), as well as normal learners, have been studied. A few investigations have reported on low incidence disorders, such as developmental amnesia, while numerous studies have focused on children with more common