Chapter 1
Implicit Memory and Aging:
Adapting Technology to Utilize Preserved Memory Functions

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ABSTRACT

There is clear evidence that aging has an effect on memory. However, not all memory processes suffer as one ages. In the current chapter, the authors review the distinctions between explicit memory (i.e., effortful storage and retrieval of information) and implicit memory (i.e., learning and memory that do not require conscious effort). They then review the evidence indicating that implicit memory does not decline at the same rate as explicit memory. They authors then discuss the possibility of using implicit memory processes (e.g. procedural memory), to aid explicit memory processes (e.g., declarative memory). Finally, they discuss the need and the opportunity to incorporate information and communications technologies into the lives of older adults in order to support memory and learning.

INTRODUCTION

Memory complaints among older adults are quite common. Not being able to recall where one left their keys, to take medication at 2:00 PM, learn the name of a new acquaintance, or commit to memory a new PIN or Internet password are the types of memory failures that are most common. Although many common failures of memory may be unavoidable, some memory processes appear to show less decline with age than others. If there are ways to tap the memory systems that have not degraded appreciably with age and take advantage of technologies that could support these intact memory systems, day to day functioning and enjoyment may improve. In the current chap-

DOI: 10.4018/978-1-4666-1966-1.ch001

ter, we hope to shed some light on how to take advantage of both.

The first goal of this chapter is to summarize literature regarding the impact of aging on implicit memory functions. Specifically, the chapter will describe and review representative evidence suggesting that implicit memory (i.e., non-declarative memory) does not suffer the same declines in older adults (or at least not the same rate of decline) as explicit (i.e., declarative) memory . The chapter will review this evidence from a dissociative perspective. Put differently, we will review selected literature that compares older adults' (age 60 or greater) and young adults' (often undergraduates, but typically less than 30 years of age) performance on explicit and implicit memory tasks. The second goal is to review principles of implicit memory function that may have implications for memory support.

This chapter is organized into three parts. In the first part of the chapter, we provide a brief explanation of the distinction between explicit and implicit memory processes. Then we provide a brief overview of the literature regarding differences between the two age groups in terms of their explicit and implicit memory performance. In the final section, we discuss the implications of adapting common technology applications to facilitate the use of implicit rather than explicit memory processes by older individuals in various learning activities.

Memory Distinctions

Long-term memory is commonly considered to consist of declarative memory (knowing that) and procedural memory (knowing how). For example, knowing that you spent the previous 4th of July at the beach is an example of declarative memory. More specifically, this is an example of episodic memory, or memory for an event that occurred in one's own life. Knowing how to tie your shoe is an example of procedural memory. Often when a skill has been well learned from extensive practice (i.e., performance is based on procedural memory), conscious awareness or control of the skill components is not necessary for effective performance. Proceduralization is the processes by which people go from relying on explicit use of declarative memory to accomplish a task to the direct application of procedural memory (Anderson, 1982). The latter type of memory function does not depend on conscious recall and is often described as a form of implicit memory. Put differently, implicit memory is a non-conscious form of memory that influences behavior. For example, one may be able to tie their shoe, but may not be able to recall the experience of learning to tie a shoe, and after deciding to perform the task, conscious awareness plays little role in successful completion of the task. This is in contrast to explicit memory that is often associated with a conscious and voluntary search such as in attempting to recall what you had for dinner the previous evening.

The division of memory into distinct systems such as declarative and non-declarative is not without controversy (Roediger, Rajaram, & Srinivas, 1990). Moreover, different theorists who advocate distinctions within memory processes often make different distinctions using diverse terminology. For example, explicit and implicit memory are often discussed in terms of different processes engaged by direct and indirect measures of memory respectively rather than different representation systems. Nevertheless, as we review the literature on aging and memory performance there will be an obvious need for a broad distinction between effortful, explicit memory processes and implicit memory processes that are not closely tied to conscious, effortful retrieval.

Explicit Memory

Explicit and effortful search of memory to retrieve specific information is typically defined as a search of declarative memory. Declarative memory is often subdivided into episodic and semantic