PERSPECTIVES ON MEMORY RESEARCH:

Essays in Honor of Uppsala University's 500th Anniversary

EDITED BY

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Preface

This conference on Perspectives on Memory Research was held at the University of Uppsala, June 20–24, 1977. A main purpose of it was to commemorate the birth of the University of Uppsala in 1477. This was also the purpose of more than 40 other conferences and symposia held in Uppsala during the year of 1977. The celebration of a 500-year-old university provides an excellent opportunity to relate the research and higher education of the past with that of the present and the future. Most of the conferences, inlcuding this one on Memory, took care of this opportunity to look at the inevitable and important historical perspective common to all sciences.

It might seem to be a good enough reason to organize a conference on memory in the context where a university is commemorated. Although it is of course interesting to note that the memory area is represented in an occasion of this sort, that was not the real reason for organizing this conference. Instead, the reason was to get students of memory together to discuss and evaluate the memory research that already has been carried out or that is presently under way and to speculate about the type of research in this area that will be carried out in the future.

The dynamic development the area has undergone during the last couple of decades stands in sharp contrast to the slow and somewhat sterile research that was carried out in the verbal learning tradition during the first half of the century. This recent dramatic development needs careful consideration in many different ways before we can enter meaningful scientific enterprises in the future. What started out as a promising and rather coherent alternative to the behavioristic tradition in the middle of the century has now turned out to be a far too diverging area leading everywhere and possibly nowhere. The

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dynamics in the multiplexity for research in the area is certainly something to protect, but at the same time it also seems to be a strong need for some overall perspective in the field. Preferably, such perspectives could then serve as guidelines for future memory research. Such a goal is probably nothing you can attain by a single book, but this volume seeks to make a modest start in directing the attention of contemporary students of memory on these problems.

The contributors to the conference and this volume were specifically asked to concentrate on overall theoretical and metatheoretical questions at the cost of empirical problems. There were no instructions to forbid the contributors to talk about data, but when such issues were discussed, they were meant to be illustrations to more abstract questions rather than ends in themselves.

It was a privilege for us to arrange this conference with all these prominent scholars. A few other qualified scientists in the field were originally invited, but for different reasons they were unable to attend the conference. With one exception, all the papers that appear in this book were presented at the conference. Just before the conference a message reached us saying that Professor Luria was unable to attend due to medical problems. A few months later the sad message that Professor Luria had died reached us. The paper by Professor Luria presented in this book thus puts an end to a long and successful career with many important contributions to science.

The conference was made possible by strong moral support from Rector Magnificus of The University of Uppsala, Torgny Segerstedt, and with economical support from the University of Uppsala, the Swedish Council for Social Science Research, the Hierta-Retzius Foundation of the Royal Swedish Academy of Sciences, the National Defense Research Institute, and from the project Pedagogical Investigations concerning the study situation of the visually handicapped (PUSS), Department of Educational Research, School of Education in Uppsala.

I am indebted to the following persons for invaluable help in organizing the conference: Trevor Archer, Robert Karlsson, Kjell Ohlsson, Jerker Rönnberg, Les Shaps, and Björn Åström.

LARS-GÖRAN NILSSON

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INTRODUCTION

1 Functions of Memory

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VIEWS ON PAST AND PRESENT

Ebbinghaus is usually considered the founder of memory research. This is somewhat misleading, for, despite the title of his now classic book *Über das Gedächtnis* (1885), his research was about learning and repetition rather than memory. Although learning and repetition are important aspects of memorization, they represent merely a small part of it.

The verbal learning approach initiated by Ebbinghaus was adopted by the behaviorists and became central to their thinking during the next three-quarters of a century. These students of verbal learning were more interested in studying how different tasks affect performance than in inferring what was going on in the minds of their subjects. Taking into consideration this reluctance to postulate any mental mechanisms intervening between stimulus and response and the complete dominance of behaviorism on the intellectual climate of the time, it is not surprising that memory research as understood today was dormant during this period.

Although there was essentially no memory research at this time, memory did mean something more than a simple acquisition of stimulus–response connections to some scholars. One such person was Freud (1915), who wrote about motivational aspects of memory along lines quite different from those of the behaviorists. According to Freud, memories repressed to an unconscious level could be brought to consciousness by psychoanalytic therapy. Thus, for Freud it was convenient to conceptualize the mind in terms of storage and retrieval of information available in an unconscious state. More "modern" ideas of memory had been put forward even earlier than this.

James (1890), for instance, when discussing consciousness, distinguished between primary and secondary memory; and Bergson (1896) distinguished between bodily and mental memory. According to these views, it was possible through mental effort to retrieve information about past experience currently not in consciousness. Other "modern" views of memory appearing in the literature somewhat later included schools of thought that emphasized the productive nature of memory. This should of course be contrasted with the reproductive character so prevalent in the verbal learning tradition. Such a productive nature of memory was emphasized by the Gestalt psychologists. Katona (1940), for instance, demonstrated this productive nature of memory in several ingenious experiments that emphasized organization and understanding instead of the reproductive character of memory commonly shown in rote learning experiments of the time. Although the productive character of memory was demonstrated very nicely by Katona and other Gestalt psychologists, the most prominent among the early scientists who supported this viewpoint was Bartlett (1932). His use of schema as a central concept has influenced later memory research considerably, although it did not have much of an impact on other students of memory during the first half of this century.

All these different views on memory were indeed promising beginnings, but in no case did they initiate any particular memory research tradition. The simplest explanation of this is probably that of a wrong *Zeitgeist* for this type of work. The enormous dominance of behavioristically oriented verbal learning research was impossible to pierce for individual scholars having alternative views of the human mind.

Approximately 30 years after the publication of Bartlett's book, a new era started in this field of psychology. The concept of schema was brought back in the realm of the information-processing approach, as were most of the other ideas touched upon earlier. Nonetheless, it was not necessarily these ideas alone that determined the birth and later the development of modern memory research. In fact, the tradition for current memory research did not appear until the late 1950s, and it was brought about by two critical factors.

One factor was the particular way of conceptualizing information (e.g., Miller, Galanter, & Pribram, 1960). This view of information, which was based on cybernetics and communication theory, made inevitable the postulation of a memory system capable of holding information from one occasion to another. The cybernetic approach of Miller et al. takes for granted that currently presented information is mapped onto some general memory structure consisting of information stored earlier. The other factor that had a considerable impact on the development of memory research tradition was the application of computer terminology. Helped by this new conceptualization of information, Broadbent (1958) realized that it was possible to regard the flow of information through different subsystems

within the organism in a way similar to that in which information is handled by a computer. The concept of memory was translated into computer language; and due to the growing popularity of the computer analogy, memory also became a central concept in human information processing. This led to a conceptualization of memory in spatial terms. Thus, memory was considered to be a location where information could be temporarily kept while appropriate processing was carried out and a location where information could be permanently stored.

The basic reason for distinguishing between a short-term and a long-term memory in such a fashion was that forgetting functions and capacity differed between the two systems. This conceptualization of memory in spatial terms might have been one of the most appealing aspects of the approach; but as was shown later, it created some of the main problems for the information-processing approach.

The computer analogy apparently appealed to a great many scientists in the area. They began working in completely new directions, many new questions were asked, and new methods were produced that opened up paths to new goals. Probably the two most important methodological contributions at this early stage were those put forward by Brown (1958) and by Peterson and Peterson (1959). As time went by, it became evident how easy it was to invent new methods that made sense for all the research questions generated. Most of these questions were inconceivable from a verbal learning point of view. One could easily envisage that the information-processing approach had a conspicuous advantage over the verbal learning terminology with respect to description and explanation of memory phenomena.

The computer analogy promised a great deal to scientists in the area who began to think that memory could be studied in a more meaningful and informative way. The approach gave rise to an enormous amount of research questions, producing empirical findings *en masse*; and the formulation of models and miniature theories became a major preoccupation of the time. Tests of all these theoretical notions in turn produced still more experiments, which required modifications of the theoretical concepts, which resulted in further tests, and so on. The inevitable outcome of all this active research work was a veritable explosion of scientific publications in the area. At first sight this gave an impression of progress and significance, and people saw obvious strategic advantages in this way of conducting research. One was the conviction that the highest degree of precision in description and explanation would be reached with such limited theory pursuits. Furthermore there was assumed to be a clear advantage in studying such a complex subject matter as human memory from different points of view, depending on which aspect of memory one was currently interested in. Because of these important principles, there was indeed important progress made during the early information-processing era. There is no question that research pursuits

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