The Essential Handbook of Memory Disorders for Clinicians

Edited by

Alan D. Baddeley
Department of Psychology, University of York, UK

Michael D. Kopelman
University Department of Psychiatry and Psychology, St Thomas’ Hospital (Institute of Psychiatry and King’s College London), London, UK
and

Barbara A. Wilson
MRC Cognition and Brain Sciences Unit, Cambridge, UK

John Wiley & Sons, Ltd
The Essential Handbook of Memory Disorders for Clinicians
The *Essential* Handbook of Memory Disorders for Clinicians

*Edited by*

Alan D. Baddeley  
*Department of Psychology, University of York, UK*

Michael D. Kopelman  
*University Department of Psychiatry and Psychology, St Thomas’ Hospital (Institute of Psychiatry and King’s College London), London, UK*  
and  
Barbara A. Wilson  
*MRC Cognition and Brain Sciences Unit, Cambridge, UK*

John Wiley & Sons, Ltd
## Contents

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Psychology of Memory</td>
<td>Alan D. Baddeley</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>The Amnesic Syndrome: Overview and Subtypes</td>
<td>Margaret O’Connor and Mieke Verfaellie</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>Posttraumatic Amnesia and Residual Memory Deficit after Closed Head Injury</td>
<td>Harvey S. Levin and Gerri Hanten</td>
<td>37</td>
</tr>
<tr>
<td>4</td>
<td>Psychogenic Amnesia</td>
<td>Michael D. Kopelman</td>
<td>69</td>
</tr>
<tr>
<td>5</td>
<td>Developmental Amnesias and Acquired Amnesias of Childhood</td>
<td>Christine M. Temple</td>
<td>91</td>
</tr>
<tr>
<td>6</td>
<td>The Memory Deficit in Alzheimer’s Disease</td>
<td>James T. Becker and Amy A. Overman</td>
<td>113</td>
</tr>
<tr>
<td>7</td>
<td>Memory Disorders in Subcortical Dementia</td>
<td>Jason Brandt and Cynthia A. Munro</td>
<td>135</td>
</tr>
<tr>
<td>8</td>
<td>Assessment of Memory Disorders</td>
<td>Barbara A. Wilson</td>
<td>159</td>
</tr>
<tr>
<td>9</td>
<td>Separating Memory from Other Cognitive Disorders</td>
<td>Diane B. Howieson and Muriel D. Lezak</td>
<td>179</td>
</tr>
<tr>
<td>10</td>
<td>Management and Remediation of Memory Problems in Brain-injured Adults</td>
<td>Barbara A. Wilson</td>
<td>199</td>
</tr>
<tr>
<td>11</td>
<td>Assessment and Management of Memory Problems in Children</td>
<td>Judith A. Middleton</td>
<td>227</td>
</tr>
<tr>
<td>12</td>
<td>Assessment and Intervention in Dementia of Alzheimer Type</td>
<td>Linda Clare</td>
<td>255</td>
</tr>
</tbody>
</table>
## CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 13</td>
<td>Reducing the Impact of Cognitive Impairment in Dementia</td>
<td>285</td>
</tr>
<tr>
<td></td>
<td><em>Bob Woods</em></td>
<td></td>
</tr>
<tr>
<td>Chapter 14</td>
<td>External Memory Aids and Computers in Memory Rehabilitation</td>
<td>301</td>
</tr>
<tr>
<td></td>
<td><em>Narinder Kapur, Elizabeth L. Glisky and Barbara A. Wilson</em></td>
<td></td>
</tr>
<tr>
<td>Chapter 15</td>
<td>Emotional and Social Consequences of Memory Disorders</td>
<td>329</td>
</tr>
<tr>
<td></td>
<td><em>Robyn L. Tate</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Author Index</td>
<td>353</td>
</tr>
<tr>
<td></td>
<td>Subject Index</td>
<td>367</td>
</tr>
</tbody>
</table>
About the Editors

Alan D. Baddeley, Department of Psychology, University of York, Heslington, York, YO10 5DD, UK

Alan Baddeley was Director of the Medical Research Council Applied Psychology Unit in Cambridge, UK for over 20 years. He is now at the University of York. He is a cognitive psychologist with broad interests in the functioning of human memory under both normal conditions and conditions of brain damage and stress.

Michael D. Kopelman, Neuropsychiatry and Memory Disorders Clinic, St Thomas’ Hospital, Lambeth Palace Road, London SE1 7EH, UK

Michael Kopelman is Professor of Neuropsychiatry in the Institute of Psychiatry based at St Thomas’ Hospital, King’s College, London. He holds qualifications in both neuropsychiatry and neuropsychology, and has particular interest and expertise in a wide range of memory disorders, both neurological and psychogenic. He runs a neuropsychiatry and memory disorders clinic at St Thomas’s Hospital.

Barbara A. Wilson, MRC Cognition and Brain Sciences Unit, 15 Chaucer Road, Cambridge CB2 2EF, UK

Barbara Wilson is a senior scientist at the MRC Cognition and Brain Sciences Unit and is Director of Research at the Oliver Zangwill Centre for Neuropsychological Rehabilitation, Ely, UK. She is a clinical psychologist with particular interests in the impact of neuropsychological memory deficits on everyday functioning and improving methods of neurorehabilitation. She was awarded an OBE in 1998 for services to medical rehabilitation, and is Editor-in-Chief of the journal Neuropsychological Rehabilitation.
Contributors

Alan D. Baddeley, Department of Psychology, University of York, Heslington, York YO10 5DD, UK
James T. Becker, UPMC Health System, Western Psychiatric Institute and Clinic, Neuropsychology Research Program, Suite 830, 3501 Forbes Avenue, Pittsburgh, PA 15213-3323, USA
Jason Brandt, Department of Psychiatry and Behavioral Sciences, Johns Hopkins University School of Medicine, 600 North Wolfe Street/Meyer 218, Baltimore, MD 21287-7218, USA
Linda Clare, Sub-department of Clinical Health Psychology, University College London, Gower Street, London WC1E 6BT, UK
Elizabeth L. Glisky, Department of Psychology, University of Arizona, PO Box 210068, Tucson, AZ 85721, USA
Gerri Hanten, Departments of Physical Medicine and Rehabilitation, Neurosurgery and Psychiatry, and Behavioral Sciences, Baylor College of Medicine, Houston, TX 77030, USA
Diane B. Howieson, Department of Neurology, Oregon Health Sciences University, 3181 SW Sam Jackson Park Road, Portland, OR 97201-3098, USA
Narinder Kapur, Wessex Neurological Centre, Southampton General Hospital, Southampton SO16 6YD, UK
Michael D. Kopelman, Neuropsychiatry and Memory Disorders Clinic, St Thomas’ Hospital, Lambeth Palace Road, London SE1 7EH, UK
Harvey S. Levin, Departments of Physical Medicine and Rehabilitation, Neurosurgery and Psychiatry, and Behavioral Sciences, Baylor College of Medicine, Houston, TX 77030, USA
Muriel D. Lezak, Department of Neurology, Oregon Health Sciences University, 3181 SW Sam Jackson Park Road, Portland, OR 97201-3098, USA
Judith A. Middleton, Oxford Department of Clinical Neuropsychology, Radcliffe Hospitals NHS Trust, The Russell Cairns Unit, The Radcliffe Infirmary, Woodstock Road, Oxford OX2 6HE, UK
Cynthia A. Munro, Department of Psychiatry and Behavioral Sciences, Johns Hopkins University School of Medicine, 600 North Wolfe Street/Meyer 218, Baltimore, MD 21287-7218, USA
Margaret O’Connor, Beth Israel Deaconess Medical Center, 330 Brookline Avenue, Boston, MA 02215, USA
Amy A. Overman, UPMC Health System, Western Psychiatric Institute and Clinic, Neuropsychology Research Program, 502 Iroquois Building, 3600 Forbes Avenue, Pittsburgh, PA 15213-3418, USA
Robyn L. Tate, Rehabilitation Studies Unit, Department of Medicine, University of Sydney, PO Box 6, Ryde, NSW 1680, Australia
Christine M. Temple, Department of Psychology, Developmental Neuropsychology Unit, University of Essex, Wivenhoe Park, Colchester CO4 3SQ, UK
Mieke Verfaellie, Memory Disorders Research Center (151-A), Boston VA Medical Center, 150 South Huntington Avenue, Boston, MA 02130, USA
Barbara A. Wilson, MRC Cognition and Brain Sciences Unit (CBU), Addenbrooke’s Hospital, Box 58, Hills Road, Cambridge CB2 2QQ, UK
Bob Woods, Dementia Services Development Centre, University of Wales, Normal Site, Holyhead Road, Bangor LL57 2PX, UK
In editing the first edition of *The Handbook of Memory Disorders*, our principal aim was to inform practicing clinicians about the extensive developments that had occurred in the study of memory and its disorders. We were pleased to discover in due course that the resulting handbook also proved to be very useful to non-clinicians with interests in both research and teaching in the field of human memory. When the opportunity to revise the handbook was offered, we opted to respond to this extended range of readers by increasing the scope of the handbook, including a wider field of topics, not all of which were equally likely to be of direct interest to the busy clinician. This resulted in a much more comprehensive handbook, as we had hoped, but also in a heftier and more expensive book, which might well be seen as less directly relevant to clinical practice. For that reason, it was suggested that a more clinically focused selection from the original 35 chapters might be desirable, decreasing the weight and cost, and resulting in a greater probability of reaching our initial target readership of forward-looking practising clinicians. The selection of chapters was made with this in mind. Authors were given the opportunity to make modifications, although the time constraints discouraged the possibility of major re-writing. We were pleased to find that all the authors were happy to agree to republication in this form, which we have titled *The Essential Handbook of Memory Disorders for Clinicians*. We are grateful to Vivien Ward for suggesting this revised edition and to Ruth Graham for making its prompt publication possible.

ADB
MDK
BAW
In this chapter I will try to provide a brief overview of the concepts and techniques that are most widely used in the psychology of memory. Although it may not appear to be the case from sampling the literature, there is in fact a great deal of agreement as to what constitutes the psychology of memory, much of it developed through the interaction of the study of normal memory in the laboratory and of its breakdown in brain-damaged patients. A somewhat more detailed account can be found in Parkin & Leng (1993) and Baddeley (1999), while a more extensive overview is given by Baddeley (1997), and within the various chapters comprising the Handbook of Memory (Tulving & Craik, 2000).

THE FRACTIONATION OF MEMORY

The concept of human memory as a unitary faculty began to be seriously eroded in the 1960s with the proposal that long-term memory (LTM) and short-term memory (STM) represent separate systems. Among the strongest evidence for this dissociation was the contrast between two types of neuropsychological patient. Patients with the classic amnesic syndrome, typically associated with damage to the temporal lobes and hippocampi, appeared to have a quite general problem in learning and remembering new material, whether verbal or visual (Milner, 1966). They did, however, appear to have normal short-term memory (STM), as measured for example by digit span, the capacity to hear and immediately repeat back a unfamiliar sequence of numbers. Shallice & Warrington (1970) identified an exactly opposite pattern of deficit in patients with damage to the perisylvian region of the left hemisphere. Such patients had a digit span limited to one or two, but apparently normal LTM. By the late 1960s, the evidence seemed to be pointing clearly to a two-component memory system. Figure 1.1 shows the representation of such a system from an influential model of the time, that of Atkinson & Shiffrin (1968). Information is assumed to flow from the environment through a series of very brief sensory memories, that are perhaps best regarded as part of the perceptual system, into a limited capacity short-term store. They proposed that the longer an item resides in this store, the greater the probability of its transfer to LTM. Amnesic patients were assumed to have a deficit in the LTM system, and STM patients in the short-term store.
By the early 1970s, it was clear that the model had encountered at least two problems. The first of these concerned the learning assumption. Evidence suggested that merely holding an item in STM did not guarantee learning. Much more important was the processing that the item underwent. This is emphasized in the *levels-of-processing* framework proposed by Craik & Lockhart (1972). They suggested that probability of subsequent recall or recognition was a direct function of the *depth* to which an item was processed. Hence, if the subject merely noted the visual characteristics of a word, for example whether it was in upper or lower case, little learning would follow. Slightly more would be remembered if the word were also processed acoustically by deciding, for example, whether it rhymed with a specified target word. By far the best recall, however, followed semantic processing, in which the subject made a judgement about the meaning of the word, or perhaps related it to a specified sentence, or to his/her own experience.
This levels of processing effect has been replicated many times, and although the specific interpretation proposed is not universally accepted, there is no doubt that a word or experience that is processed in a deep way that elaborates the experience and links it with prior knowledge, is likely to be far better retained than one that receives only cursory analysis. The effect also occurs in the case of patients with memory deficits, making it a potentially useful discovery for those interested in memory rehabilitation, although it is important to remember that cognitive impairment may hinder the processes necessary for such elaboration. Indeed, it was at one point suggested that failure to elaborate might be at the root of the classic amnesic syndrome, although further investigation showed this was not the case (see Baddeley, 1997, for further discussion).

A second problem for the Atkinson & Shiffrin model was presented by the data on STM patients that had initially appeared to support it. Although such patients argued strongly for a dissociation between LTM and STM, the Atkinson & Shiffrin model assumed that STM was necessary, indeed crucial, for long-term learning, and indeed for many other cognitive activities. In fact, STM patients appeared to have normal LTM, and with one or two minor exceptions, such as working out change while shopping, had very few everyday cognitive problems.

This issue was tackled by Baddeley & Hitch (1974), who were explicitly concerned with the relationship between STM and LTM. A series of experiments attempted to block STM in normal subjects by requiring them to recite digit sequences while performing other tasks, such as learning, reasoning or comprehending, that were assumed to depend crucially upon STM. Decrement occurred, with the impairment increasing with the length of the digit sequence that was being retained, suggesting that STM and LTM did interact. However, the effect was far from dramatic, again calling into question the standard model. Baddeley & Hitch proposed that the concept of a simple unitary STM be replaced by a more complex system which they termed “working memory”, so as to emphasize its functional importance in cognitive processing. The model they proposed is shown in Figure 1.2.

Working memory is assumed to comprise an attentional controller, the central executive, assisted by two subsidiary systems, the phonological loop and the visuospatial sketchpad. The phonological (or articulatory) loop is assumed to comprise a store that holds memory traces for a couple of seconds, combined with a subvocal rehearsal process. This is capable of maintaining the items in memory using subvocal speech, which can also be used to convert nameable but visually presented stimuli, such as letters or words, into a phonological code. STM patients were assumed to have a deficit in this system, whereas the remainder of working memory was assumed to be spared (Vallar & Baddeley, 1984). Subsequent research, based on STM patients, normal children and adults, and children with specific language impairment, suggest that the phonological loop system may have evolved for the purpose of language acquisition (Baddeley et al., 1998). A more detailed account of this system and its breakdown is given by Vallar & Papagno (2002).

![Figure 1.2](image_url)

**Figure 1.2** The Baddeley & Hitch model of working memory. Reproduced from Baddeley & Hitch (1974)