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Memory in Autism

Many people with autism spectrum disorders (ASDs) are remarkably proficient at remembering how things look and sound, even years after an event. They are also good at rote learning and establishing habits and routines. Some even have encyclopedic memories. However, all individuals with ASD have difficulty in recalling personal memories and reliving experiences, and less able people may have additional difficulty in memorising facts. This book assembles new research on memory in autism to examine why this happens and the effects it has on people's lives. The contributors utilise recent advances in the understanding of normal memory systems and their breakdown as frameworks for analysing the neuropsychology and neurobiology of memory in autism. The unique patterning of memory functions across the spectrum illuminates difficulties with sense of self, emotion processing, mental time travel, language and learning, providing a window into the nature and causes of autism itself.

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Edited by Jill Boucher and Dermot Bowler
Frontmatter
[More information](#)

*We would like to dedicate this book to the memory
of Beate Hermelin, a pioneer in the experimental
psychology of autism.*

Contents

<i>List of tables</i>	<i>page</i> x
<i>List of figures</i>	xi
<i>List of contributors</i>	xii
<i>Foreword</i>	xv
<i>Preface</i>	
PETER HOBSON AND BEATE HERMELIN	xix
Part I Introduction	1
1 Concepts and theories of memory	
JOHN M. GARDINER	3
Part II The neurobiology of memory in autism	21
2 Temporal lobe structures and memory in nonhuman primates: implications for autism	
JOCELYNE BACHEVALIER	23
3 Acquired memory disorders in adults: implications for autism	
ANDREW MAYES AND JILL BOUCHER	43
4 A comparison of memory profiles in relation to neuropathology in autism, developmental amnesia and children born prematurely	
CLAIRE H. SALMOND, ANNA-LYNNE R. ADLAM, DAVID G. GADIAN AND FARANEH VARGHA-KHADEM	63
5 Possible parallels between memory and emotion processing in autism: a neuropsychological perspective	
YIFAT FARAN AND DORIT BEN SHALOM	86

Cambridge University Press
978-0-521-18401-4 - Memory in Autism
Edited by Jill Boucher and Dermot Bowler
Frontmatter
[More information](#)

viii	Contents	
6	Dysfunction and hyperfunction of the hippocampus in autism? G. ROBERT DELONG	103
	Part III The psychology of memory in autism	123
7	Memory within a complex information processing model of autism DIANE L. WILLIAMS, NANCY J. MINSHEW AND GERALD GOLDSTEIN	125
8	Episodic memory, semantic memory and self-awareness in high-functioning autism MOTOMI TOICHI	143
9	Episodic memory and autonoetic consciousness in autistic spectrum disorders: the roles of self-awareness, representational abilities and temporal cognition SOPHIE LIND AND DERMOT BOWLER	166
10	Impairments in social memory in autism? Evidence from behaviour and neuroimaging SARA JANE WEBB	188
11	Memory characteristics in individuals with savant skills LINDA PRING	210
12	Working memory and immediate memory in autism spectrum disorders MARIE POIRIER AND JONATHAN S. MARTIN	231
13	Rehearsal and directed forgetting in adults with Asperger syndrome BRENDA J. SMITH AND JOHN M. GARDINER	249
14	Memory, language and intellectual ability in low-functioning autism JILL BOUCHER, ANDREW MAYES AND SALLY BIGHAM	268

Cambridge University Press
978-0-521-18401-4 - Memory in Autism
Edited by Jill Boucher and Dermot Bowler
Frontmatter
[More information](#)

Contents	ix
Part IV Overview	291
15 Practical implications of memory characteristics in autistic spectrum disorders RITA R. JORDAN	293
16 A different memory: are distinctions drawn from the study of nonautistic memory appropriate to describe memory in autism? LAURENT MOTTRON, MICHELLE DAWSON AND ISABELLE SOULIÈRES	311
17 Memory in ASD: enduring themes and future prospects DERMOT M. BOWLER AND SEBASTIAN B. GAIGG	330
<i>Index</i>	350

Tables

1.1 Memory systems	<i>page</i> 6
1.2 Encoding and retrieval processes	9
4.1 Participants' details (from Isaacs <i>et al.</i> , 2003; Salmond <i>et al.</i> , 2005)	74
4.2 RBMT subtest scores for the three participant groups and the two comparison groups (from Isaacs <i>et al.</i> , 2003; Salmond, 2001)	75
8.1 Graphic, phonological and semantic questions used in Study 3 levels-of-processing task	152
8.2 Phonological, semantic and self-referential questions used in Study 4 levels-of-processing task	157
11.1 Same-day and different-day examples presented to participants	217
14.1 Summary of findings from studies using the Wechsler intelligence tests (from the paper by Siegel, Minshew & Goldstein, 1996, with permission)	272

Figures

1.1 Three kinds of converging evidence	page 16
4.1 Prospective memory composite score from the RBMT in the DA, PT and ASD groups. Error bars represent Standard Deviation. (Data from Isaacs <i>et al.</i> , 2003, Salmond <i>et al.</i> , 2005)	76
8.1 Correct recall (%) in the three regions	147
8.2 Correct completion (%) of unrelated and related word fragments	150
8.3 Correct recognition (%) of targets (nouns) due to three levels (graphic, phonological, semantic) of processing	153
8.4 Correct recognition (%) of targets (adjectives) due to three levels (phonological, semantic, self referential) of processing	158
11.1 Figure displaying performance (DP: musical savant; SE: AP-matched control musician) on a disaggregation task	221
13.1 RS size and RS repetitions for adults with AS and typical adults	256
13.2 Mean recall of words for each serial position in the lists for adults with AS and typical adults	258
13.3 Mean number of rehearsals of words for each serial position in the lists for adults with AS and typical adults	258
13.4 Proportion of words correctly recognized according to instruction, divided between R and K responses for adults with AS and typical adults in the long cue delay condition	261
13.5 Proportion of words correctly recognized according to instruction, divided between R and K responses for adults with AS and typical adults in the short cue delay condition	261
14.1a Learning that a word refers to a particular referent and to the category to which the referent belongs	275
14.1b Learning to label a particular referent	276

Cambridge University Press
978-0-521-18401-4 - Memory in Autism
Edited by Jill Boucher and Dermot Bowler
Frontmatter
[More information](#)

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Cambridge University Press
978-0-521-18401-4 - Memory in Autism
Edited by Jill Boucher and Dermot Bowler
Frontmatter
[More information](#)

List of contributors xiii

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Foreword

Despite the fact that memory in people with autism spectrum disorders (ASD) has been researched for over fifty years, there has been very little in the way of attempts to synthesize or codify the findings. The two most notable such attempts are the seminal monographs *Psychological Experiments with Autistic Children* (Hermelin & O'Connor, 1970) and *Seeing and Hearing and Space and Time* (O'Connor & Hermelin, 1978), now over thirty years old. The period since the publication of these two books has seen considerable changes in the landscape of autism research, the most important of which have been an enlargement of the concept of 'autism' to encompass a spectrum of conditions that includes but is not limited to that first described by Kanner (1943), and the mushrooming of research into all aspects of the spectrum.

Memory research has grown in parallel with this general increase. One of us (JB) was heavily involved in the early phase of this growth, in particular developing the hypothesis that the patterning of memory functions, at least in lower-functioning individuals with ASD, had some parallels with that seen in the amnesic syndrome. This work continued into the 1980s but then diminished, partly because of the lack of a community of scholars interested in the topic, but also because memory was not seen as a particular problem in those high-functioning individuals who were becoming the main focus of research. These things changed, however, when in the late 1990s people such as Nancy Minshew and DB and his colleagues became interested in memory patterns in higher-functioning individuals including those with Asperger syndrome. At this time, modularist accounts of ASD were increasingly called into question, and researchers began to seek out other explanations for the patterning of autistic behaviour, this time in terms of more general psychological processes. It is this desire to understand ASD in terms of a developmentally unfolding patterning of general processes such as attention, learning and memory that has driven the approaches to research adopted by both of us. Our position contrasts with those who try to explain the surface patterning of behaviour by

Cambridge University Press
978-0-521-18401-4 - Memory in Autism
Edited by Jill Boucher and Dermot Bowler
Frontmatter
[More information](#)

xvi Foreword

invoking damage to modular systems that were thought to drive such patterns in a highly specific way. From our different perspectives we both share the view that studying memory enables us to understand better the inner world of the person with ASD as well as to unpack the relation between language and cognition, especially in those whose language development is atypical. Increasing understanding in these areas will help to develop a clearer picture of underlying brain functioning in this population. Thus, for both of us, we do not see ASD as being 'due to a problem with memory'. Rather we see the unique patterning of memory functions in this population as providing a window into the causes of those behavioural characteristics that are defining features of conditions on the spectrum. For these reasons, we felt that it was time to bring together an up-to-date compendium of research on memory in ASD.

The organization of the book reflects different facets of current memory research in ASD. The Preface by Hobson and Hermelin sets the scene by reminding us of the importance of a consideration of memory to an understanding of ASD. It also serves as a link with the earlier work in the field. The introductory chapter by Gardiner outlines the important changes in how psychologists understand and conceptualize human memory and serves to up-date what for many of us is a relatively unconstructed undergraduate knowledge of the topic. The later sections include chapters that cover neurobiological and psychological aspects of memory. These sections consist mostly of reports by scientists of their most recent work in specific areas and are designed to give readers a flavour of the latest findings and the development of ideas in the different fields. The final section broadens focus in three ways: by providing an applied perspective, by casting a critical eye and by attempting to identify recurrent and promising themes in the field.

As a compendium of approaches to different facets of the same underlying phenomenon, this is a book more to be dipped into than read from cover to cover. Acknowledging this aspect of the book has led to a number of editorial decisions on our part. For example, anyone reading the book right through will encounter quite a bit of repetition of material. As editors, we faced the choice of cutting much of this repetition by making heavy use of cross-referencing. However, we felt that this would be frustrating for people who wished to read only a subset of the contributions. We therefore decided to leave each author to provide what they thought was the best background against which to set their work. In this respect, we have limited our editorial interventions to ensuring that a reasonably consistent account of the earlier literature emerges across chapters.

Cambridge University Press
978-0-521-18401-4 - Memory in Autism
Edited by Jill Boucher and Dermot Bowler
Frontmatter
[More information](#)

Foreword

xvii

We also had to make a number of decisions on how diagnosis, classification and labelling should be reported. Terminology in the field of autism research has become a minefield. Forty years ago, research was limited to studies of ‘autistic children’ of the kind described by Kanner. Since then, the phenomenon of ‘autism’ (i.e. the symptomological cluster manifested by such children) has been extended to a spectrum of conditions that are now often referred to as ‘autism spectrum disorders’ or ASDs. In this book we have, as far as possible, allowed authors to use their preferred terminology, with the result that ‘people with autism’, ‘people with ASD’ or ‘people with an ASD’ are used interchangeably. We have also allowed interchangeable use of the terms ‘autism’ and ‘ASD’ to refer to the symptomological picture of these conditions. In all but one chapter, we have insisted that the formula ‘people/children/adults/individuals with ...’ be used. We have asked authors to avoid the use of ‘patients’ or ‘suffering from’. The one exception to all this is in Chapter 17 by Mottron and colleagues who, for reasons that they explain, prefer the term ‘autistics’.

Related to the question of how to describe autism in general terms is the issue of when and how to distinguish between high- and low-functioning autism (HFA and LFA) and, in the case of the former, how to treat the reporting of Asperger syndrome (AS). In general, HFA is used to refer to any individual with language and intellectual attainments currently within normal limits. In this respect, the term includes AS but is broader and less committed to the developmental history requirements of current diagnostic systems. Where authors have chosen to use the term AS, we have tried to ensure that there is some clarification on whether this is on the basis of strict criteria including the requirements on language development or on looser criteria based solely on present-state evaluations. Terminological issues are not just limited to clinical groups. When reference is made to children, we have insisted on the use of ‘typically developing’ although we have allowed the use of ‘normal adults’. We have also asked authors to use the term ‘comparison’ when referring to groups with whom the performance of an ASD group is compared. We prefer this term to the widely used ‘control group/participants’ because, technically, the investigator does not exercise any control as is the case when a control task is used (see Burack *et al.*, 2004 for further discussion).

We should both very much like to thank all the contributors to this volume, all of whom delivered their manuscripts and revisions in a timely fashion. During the preparation of the book, JB was supported by the Economic and Social Research Council and DB by the Wellcome Trust, the Medical Research Council and the Economic and Social

Cambridge University Press
978-0-521-18401-4 - Memory in Autism
Edited by Jill Boucher and Dermot Bowler
Frontmatter
[More information](#)

xviii Foreword

Research Council, as well as by the Psychology Department of City University, London.

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Preface

Peter Hobson and Beate Hermelin

‘It’s a poor sort of memory that only works backwards’, the Queen remarked. Lewis Carroll, *Through the Looking Glass* (1872), chapter 5

Memory is a funny thing. It is exercised in the present, but (we fondly suppose) it conjures up the past, or perhaps more accurately, what we register and recall from a time gone by. Sometimes it is only the effects of past experience that feature in memory – what we have come to know the world to be like, what we have learned words signify, what we feel we know is linked with what – and sometimes it seems more like revisiting what we experienced some while back (whether from a distant age, or from the moment just faded), how it was to be the person who we were then, seeing and feeling and thinking those things that we saw and felt and thought. Without memory of the world, or without memory of what we were when engaging with that world, we would become shadow-beings inhabiting a theatre of spectral forms.

As the Queen of *Through the Looking Glass* remarks, memory can’t just be a matter of working backwards. Rather, it is the backward-seeming reach of personal experience that also exists in the present and the future, structured and understood by ways of knowing and communicating that are profoundly influenced by what we, the human community, share and judge alike. Memory shows us how we mentally reconstruct what has, and had, meaning.

But what has this rather abstract circumspection got to do with the experimental psychology of memory in individuals with autism? Rather a lot, we think. In order to explain why, perhaps we might begin by casting back ...

Memoirs

Picture a time around fifty years ago, some twenty years or so after Kanner (1943) had described the syndrome of autism. By now the condition was widely acknowledged, but almost completely obscure. For

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978-0-521-18401-4 - Memory in Autism
Edited by Jill Boucher and Dermot Bowler
Frontmatter
[More information](#)

xx *Peter Hobson and Beate Hermelin*

some time, Neil O'Connor and Beate Hermelin had been working with severely learning-disabled children. In the course of this research, they came across some children who had the diagnosis of autism. When they explored the literature on autism, they found rich descriptions of the children's behaviour, but almost no experimental research. Just as dismaying, they were confronted with theoretical accounts that were mainly variations on the theme of autism as the outcome of aberrant parent-child relations. Quite simply, this did not square with what they encountered with the children and their parents. Indeed from what parents and teachers recounted, for example how their children looked at people's faces in the same way as they looked at the objects around them, it seemed that there was something fundamentally unusual in their perception of, as well as thinking about, the world.

So it was that Hermelin and O'Connor decided to explore in what respects these remarkable children differed from matched children without autism who were similar in chronological and mental age. They studied abnormalities that were not restricted to the domain of cognition, as narrowly conceived, but extended across a spectrum of abilities in perception, language, intellectual organization, and responsiveness to the animate (people) as well as inanimate world. Looking back, it is striking how others had not systematically investigated such psychological functions in and through children with autism – and rather brilliant that now, new vistas of uncharted territory could be mapped through the deployment of carefully controlled and specifically focused experiments. Here was a new way of looking at autism, and beyond this, through the application of the experimental method to an intriguing and perplexing condition, a new perspective on mental processes as such.

We shall not attempt to summarize findings from this work. By way of grounding the remainder of this preface, however, we shall quote the formulation that Hermelin and O'Connor offered at the conclusion of their book, *Psychological Experiments with Autistic Children* (1970): 'We regard the inability of autistic children to encode stimuli meaningfully as their basic cognitive deficit' (p. 129).

This formulation was both specific and prescient, yet it begged as many questions as it answered – as any self-respecting scientific advance needs to do. There is *something* about perceiving and organizing meaningful material that is essential to what makes autism 'autism'. With appropriate methodology, one can specify how the abnormality is manifest in a variety of settings. Moreover, this something is dissociable from other facets of intelligence that appear to be relatively unimpaired or, if impaired, less unusual in quality. But *the source* of the dysfunction remains an open question. In the ensuing years, Hermelin and O'Connor gave increasing

prominence to the children's difficulties in perceiving and relating to people on the one hand (as in suggesting that autism is a logico-affective disorder), and to modular abilities that might be spared as well as impaired in autism, on the other.

To the present

The quest for understanding the psychology of autism continues to fire research enthusiasm and to inspire methodological ingenuity. After all, when we study memory we are discovering things about what is perceived; how what is perceived may be understood; how what is understood may be linked with other things that were registered previously, or at the time, or since; how what is retained is coloured by action and feeling and either integrated with or distanced from experiences of oneself and others; and, of course, how all this is reconstituted at a fresh time, often a fresh place, and even by a fresh (for instance, now more-grown-up) individual. By investigating low-functioning as well as high-functioning children, we may learn how intelligence may also bear upon the natural history of the disorder. By returning again and again to what we fail to encompass in our cherished theories, we might even be led to a radical rethink of the inter-relations among cognitive, conative and affective dimensions of human mental life.

Before coming to our own reflections on one future direction for research on memory in autism, it would be as well to identify some potential pitfalls that exist for ourselves and others who try to interpret whatever evidence is available. Firstly, there are the twin dangers of underplaying the neurological level of explanation of psychological dysfunction, or elbowing out psychology in favour of neurology. The organization of neural structures in the brain and psychological structures in the mind have complex interdependence in development. Experiences change brains, just as brains (and bodies) are needed for experiences. We should heed the cautionary messages contained in several chapters of this book (for example, those by Toichi, by Williams, Minshew & Goldstein, and by Webb) suggesting how memory impairments may be a downstream consequence of perceptual, information processing, executive functioning *or* social motivational deficits.

Secondly, we must try *not* to conclude that if a given strategy such as elaborative rehearsal (e.g. Smith & Gardiner, this volume) offsets certain memory deficits in autism, it follows that a relative absence of this strategy is the source of impaired memory. And even if it proves to be so, this does not preclude a quite different and additional account of how the strategy comes to be used, or not used, in the first place.

Cambridge University Press
 978-0-521-18401-4 - Memory in Autism
 Edited by Jill Boucher and Dermot Bowler
 Frontmatter
[More information](#)

xxii Peter Hobson and Beate Hermelin

Thirdly, we need to respect the heterogeneity of autism, and reconcile this with findings of surprising homogeneity at certain levels of psychological functioning.

So if one is trying to account for such memory-related abnormalities as those in concept formation or retrieval, or in organizing information, or in drawing upon source memory, then one needs an account of typical development in relation to which one can identify derailments in developmental processes, whether in terms of neurology (e.g. frontal lobe functions), or those of cognitive development (e.g. central coherence), or those of social relatedness (e.g. intersubjectivity) – or in terms that may cross such domains, such as . . . encoding stimuli meaningfully.

Thoughts for the future

What we would now like to offer is a kind of premonition for the future study of memory. This takes the form of a framework prefigured, but not yet fully explicated, in a number of the contributions to this book, perhaps most notably in the chapter by Lind and Bowler.

Consider the following excerpt from the writings of the most famous rememberer in literature:

Et tout d'un coup le souvenir m'est apparu. Ce goût c'était celui du petit morceau de madeleine que le dimanche matin à Combray . . . ma tante Léonie m'offrait après l'avoir trempé dans son infusion de thé ou de tilleul.

And suddenly the memory revealed itself. The taste was that of the little piece of madeleine which on Sunday mornings at Combray . . . my aunt Leonie used to give me, dipping it first in her own cup of tea or tisane. (Marcel Proust, *Du côté de chez Swann* (*Swann's Way*, 1913, 1, p. 99))

Why are we confident that Proust was not someone with autism? What this memory, and its remembering, makes manifest, is how human subjectivity is a web of relational experiences. Relations both to people and to things. Or more specifically, relations towards things as meaningfully connected with people (including oneself in the past, present and future), and people as meaningful in personal experience. And whatever it is that distinguishes this form of memory from memories typical of individuals with autism, it is difficult to see how it might be captured by accounts that focus upon theory of mind, or central coherence, or executive function, if these fail to encompass the subtle but powerful specialness of *personal* remembering so vividly conveyed by Proust.

Our suggestion for a theoretical framework is founded upon what has gone before: the ideas that there are certain modular processes that can develop and function relatively independently from much else in the

Cambridge University Press

978-0-521-18401-4 - Memory in Autism

Edited by Jill Boucher and Dermot Bowler

Frontmatter

[More information](#)

Preface

xxiii

brain/mind, but that beyond this, *interpersonal* processes profoundly influence what become intrapsychic processes (*à propos* of which, Neil O'Connor was always keen to stress the importance of what Pavlov called the 'second signalling system'). We have been struck by the relatively empty feel to the self-descriptions of children and adolescents with autism (Lee & Hobson, 1998), something that corresponds with what Bowler has studied in the form of a diminished involvement of a sense of self in their remembered experience. Or from a complementary perspective, is it not significant that those 'foolish wise ones' whose 'bright splinters of the mind' are sometimes dazzling, show so little interest in the artistic creations of others (Hermelin, 2002)? We are also impressed by the nature of what is, and what is not, achieved by way of 'encoding stimuli meaningfully' in the case of children with autism – and as an important corollary, how among children without autism, 'stimuli' may be conceptualized, grouped and regrouped, creatively and flexibly dealt with and thought about, embedded in but also disembedded from the settings in which they are experienced. What is it that usually supports memory in the minds of children who do not have autism, but which needs to be provided by *external* scaffolding in the case of children with autism? What is it that distinguishes 'concept identification', relatively intact among individuals with autism, from 'concept formation', the spontaneous organization of meaningful categories that can be reorganized and adjusted to context (Minschew, Meyer & Goldstein, 2002)?

Well, consider all those components of memory, such as registration, representation, and retrieval, as entailing positions or stances from which memories are entertained as memories. For example, episodic memory involves remembering according to self/other-anchored experience. We believe that a primary source of relating to one's own relations to the world is the interiorization of the many ways of relating to and identifying with *other people's* stances in relation to oneself and the world. At least to some degree, an individual arrives at the ability to move among and co-ordinate different perspectives on the world *and* him/her own self, including his or her own self as one who experiences and thinks, through adopting and assimilating other-centred attitudes.

So it is that Proust's memory entails him relating to himself as experiencing a set of events with feeling. In a sense, he *identifies with himself-as-represented* (and see how rich a concept of representation is involved here, so much more than a picture) – and lo! the feelings return in the modified form characteristic of identification. Then when he relates to his own relations with his aunt Leonie, she is experienced to have her own self-anchored orientation, as well as an orientation towards and significance for Proust himself. He identifies with her sufficiently to give her personal

life, in his own mind. One can sense how the mental space needed to move from person to person, from stance to stance, from subjectivity to objectivity and back, is bound up with interpersonal linkage and differentiation. We suggest it is this interpersonal infrastructure to certain forms of memory that yields not only the phenomenology of what is recalled, but sometimes the fact that it is recalled at all.

Whether this framework will prove helpful, time will tell. Time, that is, filled with creative research and penetrating theoretical reflection – as represented in this book.

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