Edited by

Jonni L. Johnson, Gail S. Goodman, and Peter C. Mundy

THE WILEY HANDBOOK OF

Memory, Autism Spectrum Disorder, and the Law

WILEY Blackwell

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Contents

Notes on Contributors

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Daniel Bederian-Gardner, Ph.D., graduated from the University of California, Davis, studying various issues relating to children's involvement as witnesses in the legal system, such as the interplay of children's moral development and testimony. He has studied and authored chapters about characteristics of child witnesses that influence judgments of their credibility. Dr. Bederian-Gardner has also conducted research on true and false memory across development. He is currently addressing the impact of foster care on mental health outcomes.

Dermot M. Bowler graduated from Trinity College Dublin in 1976 and gained his Ph.D. from the University of London in 1986. After working at the Thomas Coram Research Unit, and subsequently, with Dr. Lorna Wing at the Medical Research Council, he joined City, University of London in 1990. At City, he set up the Autism Research Group and currently holds the position of Professor of Psychology. He has also held an adjunct professorship at McGill University, Montreal, as well as a European Union-funded visiting chair at the University of Caen and the French National Institute for Medical and Health Research (INSERM). His research interests center on the neuropsychology of memory across the lifespan in individuals with autism spectrum disorders.

Neil Brewer, Ph.D., is the Matthew Flinders Distinguished Professor of Psychology at Flinders University, South Australia. He is an experimental psychologist with broad interests in the psychology-law area, including eyewitness identification and reporting, determinants of testimonial credibility, and cognitive and social characteristics that may contribute to naive involvement in criminal activity by ASD individuals. He is on the editorial boards of *Law and Human Behavior* and *Psychology, Public*

Policy and Law, and has served on the editorial boards of all of the major psychology-law journals. Professor Brewer is just completing his term as Editor of the *Journal of Experimental Psychology: Applied*.

Lorinda B. Camparo, Ph.D., is Professor in the Department of Psychological Sciences at Whittier College, where she has taught and conducted research on enhancing children's narrative reports since 1997. Dr. Camparo has published numerous articles and book chapters, and recently co-authored the book *Evidence-based child forensic interviewing: The Developmental Narrative Elaboration Interview* (Oxford University Press, 2014) with Dr. Karen Saywitz. Dr. Camparo has also conducted workshops on interviewing children for lawyers, judges, police officers, and social workers, and she has served as an expert witness on cases involving children alleging sexual abuse.

Michael Carlin, Ph.D., attended Peabody College of Education and Human Development of Vanderbilt University for his graduate training, and worked with Dr. Sal Soraci and Dr. Alan Baumeister at the John F. Kennedy Center. Upon graduation, he moved to Massachusetts to work at the Eunice Kennedy Shriver Center from 1994 to 2007. He then accepted a faculty position at Rider University, where he teaches courses in Cognitive and Developmental Disabilities, Statistics, and Cognitive Psychology.

Yoojin Chae, Ph.D., is Assistant Professor in Human Development and Family Studies at Texas Tech University. Her research focuses on children's abilities as witnesses, including children's eyewitness memory and suggestibility, trauma and memory, attachment and memory, language and memory, forensic interview techniques, and adults' evaluations of children's autobiographical memory. She received her doctorate in human development from Cornell University.

Laura Crane, Ph.D., is Senior Teaching and Engagement Fellow at the Centre for Research in Autism and Education (CRAE) at the University College London Institute of Education in the United Kingdom. Dr. Crane completed her undergraduate and postgraduate training in Psychology at Goldsmiths, University of London, before taking postdoctoral research positions at City, University of London and Goldsmiths, University of London. Dr. Crane's research focuses on supporting children and adults on the autism spectrum within the criminal justice system as well as exploring the educational and healthcare experiences of autistic adults, parents of children on the autism spectrum, and professionals working in the field of autism.

Deborah Davis, Ph.D., is Professor of Psychology at the University of Nevada, Reno, and a member of the faculty of the National Judicial College. She has published widely in the areas of witness memory, police interrogation and confessions, communicating and understanding sexual intentions, and other areas as well. She worked for more than 20 years as a trial consultant, has testified as an expert witness in close to 150 trials, and is a frequent speaker at Continuing Legal Education seminars across the country.

Sebastian B. Gaigg, Ph.D., joined the Autism Research Group at City, University of London in 2001 and has since then pursued two primary research interests. One strand of his work focuses on understanding learning and memory processes across

the autism spectrum, with projects ranging from the examination of episodic memory in autistic adults who live relatively independent lives to studies of basic learning processes in young autistic children who have very significant language and intellectual impairments. His second strand of work seeks to develop a better understanding of the emotional lives of individuals with autism, particularly concerning the mechanisms underlying the unusually high prevalence of anxiety disorders in this population.

Lorna Goddard, Ph.D., is a senior lecturer at Goldsmiths, University of London. She has published over 20 articles and chapters related to theoretical research on autobiographical memory in autism. She is also a registered cognitive behavior therapist involved in researching and delivering intervention service for individuals with autism spectrum disorder.

Deborah Goldfarb, J.D., is a developmental psychology doctoral candidate at the University of California, Davis. Prior to attending graduate school, Deborah worked as an attorney, including two years as a law clerk to a federal district court judge. She graduated *cum laude* with a Juris Doctor degree from the University of Michigan Law School and a Bachelor of Science degree in Psychology from the University of Illinois, Urbana-Champaign. She has published research on children's legal involvement in law reviews, books, and journals, and has presented this work internationally.

Alejandra Gonzalez is a researcher at the University of California, Davis, currently conducting studies on trauma and memory. She received a Bachelor of Arts degree in Psychology and a Bachelor of Science degree in Genetics and Genomics from the University of California, Davis, and she has published about the topic of child suggestibility in the courtroom. Her interests include trauma-related psychopathology as well as challenges faced by disadvantaged populations in the legal system.

Gail S. Goodman, Ph.D., is Distinguished Professor of Psychology at the University of California, Davis. Her research concerns such topics as children's and adults' eyewitness memory, child maltreatment, forensic interviewing, victimization, legal involvement, and trauma and memory. She has served as President of several divisions of the American Psychological Association (e.g., Developmental Psychology, American Psychology-Law Society, Child and Family Policy and Practice). She is internationally known for her research on victims and witnesses, which has been cited multiple times by the U.S. Supreme Court. Dr. Goodman has published widely and received numerous national awards and grants for her research and writings.

Catherine Grainger, Ph.D., is a lecturer at the University of Stirling. Her research focuses on understanding the nature of autism spectrum disorder. In particular, she is interested in understanding self-awareness, theory of mind, and memory in autism.

Ambar Guzman, ACSW, is a clinical social worker and recent graduate of the University of California Los Angeles, where she was also a trainee for the University of California Leadership Education in Neurodevelopmental and Other Related Disabilities (UC-LEND). She worked as a therapist for adolescents, and then most recently, transitioned to serving the community as a medical social worker. Her experience in the forensic interviewing field includes her past work as the project director of a child interviewing lab and serving as a bilingual forensic interviewer for a local Children's Advocacy Center.

Sue D. Hobbs, Ph.D., is a developmental psychologist, Assistant Professor at Sacramento State University in the Child Development Area of the College of Education, and a member of the American Psychological Association Division 7 (Developmental Psychology) Executive Committee. Her research focuses on two key areas of child development as they relate to child victims and witnesses: 1) children's eyewitness testimony, specifically, suggestibility, memory development, and secret-keeping; and 2) factors influencing the outcomes of foster youth once they emancipate from care.

Jonni L. Johnson is completing her Ph.D. at the University of California, Davis, with research interest in developmental psychology, autism spectrum disorder, and the law. Funded by the National Science Foundation, American Psychological Association, and American Psychology-Law Association, her dissertation examines memory functions in youths with and without autism spectrum disorder and the utility of forensic memory interviewing protocols. She has published and presented scientific papers on the development of children's eyewitness abilities, perceptions of children's eyewitness abilities, and more recently, eyewitness abilities in individuals with autism spectrum disorder.

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Sophie E. Lind, Ph.D., is a Senior Lecturer in Psychology and member of the Autism Research Group at City, University of London. Her research explores cognition in autism, and her key interests include self-referential cognition, episodic memory, episodic foresight, and metacognition in people with this disorder.

Arthur MacNeill Horton, Jr., received his Ed.D. degree from the University of Virginia in 1976, holds ABPP Diplomates in Clinical and Behavioral Psychology and an ABN Diplomate in Neuropsychology, and is the author/editor of 15 books. He is a past-president of the National Academy of Neuropsychology (NAN) and the Maryland Psychological Association (MPA). Previously, Dr. Horton was a Program Officer with the National Institutes of Health (NIH). Currently, Dr. Horton is Editor in Chief of *Applied Neuropsychology*. He recently co-edited (with Danny Wedding, Ph.D.), *The Neuropsychology Handbook* (3rd edition).

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Katie Maras, Ph.D., is a Lecturer in Psychology at the University of Bath in the United Kingdom. She has an international reputation for her research in the field of

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Haylie L. Miller, Ph.D., is an experimental psychologist and Assistant Professor in the Department of Physical Therapy at the University of North Texas Health Science Center in Fort Worth, Texas. Her training in cognitive development and expertise in autism spectrum disorder (ASD) support two key areas of study: gist-based information processing and memory, and sensorimotor integration. Dr. Miller currently directs a federally funded (National Institutes of Health, National Science Foundation) program of research on the development of visual information processing and attention in ASD, and their impact on functional movement.

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Matilda Ohlsson, Ph.D., received her Bachelor of Science degree in Psychology from The University of York, followed by a Master of Science degree in Memory and Memory Disorders from the University of Leeds. After this, she completed her training in clinical psychology at the University of Hull. Currently, she is a practicing clinical psychologist working across neuropsychology and neurorehabilitation services in Leeds.

Valerie Reyna, Ph.D., is Professor and Director of the Human Neuroscience Institute at Cornell University. She has been elected to the National Academy of Medicine and the Society of Experimental Psychologists, and served as President of the Society for Judgment and Decision Making. Her research integrates brain and behavioral approaches to understand and improve judgment, decision-making, and memory across the lifespan. Her recent work has focused on the neuroscience of risky decision-making and its implications for health and well-being, especially in adolescents; applications of artificial intelligence to understanding cancer genetics; and medical and legal decision-making (e.g., jury awards, medication decisions, and adolescent crime).

Joanne Richards, Ph.D., worked in special education for 20 years, and set up units and outreach services for children with multisensory impairment and teenagers with complex communication needs. She is a lecturer at the University of Portsmouth for the Institute of Criminal Justice and a member of the Centre of Forensic Interviewing.

Karen J. Saywitz, Ph.D., is Professor at the UCLA, School of Medicine, Department of Psychiatry and Bio-behavioral Sciences and a developmental and clinical psychologist. For over 25 years, she has directed programs providing mental health services to families and taught normative child development to students in medicine, law, psychology, social work, and nursing. She is an expert on the capabilities, limitations, and needs of children involved in the legal system, authoring articles applying developmental science to legal decision-making that have been cited by the U.S. Supreme Court. Dr. Saywitz has won national awards for research, teaching, advocacy, and clinical service; she has chaired blue-ribbon panels on public health strategies to prevent child maltreatment in primary care settings; and authored handbooks for judges and forensic interviewers on the efficacy of child interview strategies and preparing child witnesses for court.

Henry V. Soper received his Bachelor's degree from Yale University; he then received his M. A. and Ph.D. from the University of Connecticut. He has served as a reviewer for *Perceptual and Motor Skills, Psychological Reports*, *Applied Neuropsychology*, both *Adult* and *Child*. He is a Fellow of the National Academy of Neuropsychology and the Psychonomic Society, and on the Editorial Board of *The Encyclopedia of Neuropsychological Disorder*. He has published over 130 abstracts, papers, chapters, and books in the neurosciences, neuropsychology, and related fields in medicine and psychology, and chaired over 40 dissertations.

Céline Souchay is a Senior Researcher at Le Centre National de la Recherche Scientifique (CNRS) in France. After completing her Ph.D. on metacognition in Alzheimer's disease in Tours in 2000, she held posts in Montreal, Strasbourg, Plymouth, and Leeds. She moved back to France in 2012 and to Grenoble in 2015. She is on the editorial board of the journal *Memory* and is co-director of a national research group on memory. She has a broad interest in the higher-order contributions to episodic memory in various clinical populations.

David M. Williams, Ph.D., is Professor of Developmental Psychology and head of the Developmental Research Group at the University of Kent. His research focuses on theory of mind, metacognition, and language development in people with autism and the neurotypical population.

Diane L. Williams, Ph.D., CCC-SLP is Professor and Head of the Department of Communication Sciences and Disorders at Pennsylvania State University. She has authored numerous peer-reviewed publications and book chapters on the neurobiological and neuropsychological basis of Autism Spectrum Disorders (ASD) with an emphasis on language, cognition, and memory. Dr. Williams has worked extensively with individuals with ASD across the age span in her clinical practice as a speech-language pathologist.

Emily F. Wood is pursuing her Ph.D. in Interdiscplinary Social Psychology at the University of Nevada, Reno. She investigates topics related to decision-making, stigma, prejudice, and injustices in the legal system.

Robyn L. Young, Ph.D., has published widely in peer-reviewed journals, such as *Journal of Autism and Developmental Disorders, Autism Research*, and *Psychological Assessment*, with over 30 papers published in the field of autism spectrum disorder (ASD). Her initial research involved the development of an early screening tool and intervention programs for young children with ASD. Currently, she is often asked to assess older individuals and provide expertise as an expert witness and submit reports to the court, specifically concerning whether ASD may be considered as a mediating factor in criminal activity. This has led to the study of adults with ASD, focusing on diagnostic issues and on ASD adults' interactions with the criminal justice system. This work stimulated a book with co-author Neil Brewer entitled *Crime and Autism Spectrum Disorder: Myths and Mechanisms* (Brewer & Young, 2015).

Tiziana Zalla, Ph.D., is Research Director at the Centre National de la Recherche Scientifique (CNRS) and head of the Social Cognition group at the Jean Nicod Institute, in the Department of Cognitive Studies at the École normale supérieure in Paris. Her work mainly focuses on social cognition in people with autism spectrum disorders and people who fall within the typically developing population, using a multidisciplinary approach bringing together concepts and methodologies from social psychology, neuropsychology, cognitive neuroscience, and biological psychiatry.

Irina Zilberfayen has been a Licensed Professional Counselor since 2000, and is currently pursuing a Ph.D. in Clinical Psychology with a Neuropsychology concentration at Fielding Graduate University. Her interest in developmental disorders grew out of her teaching background, clinical training, and counseling experience with children and their families with learning and developmental disorders in schools and community mental health clinics.

Acknowledgment

Autism Spectrum Disorder, Memory, and the Legal System: Knowns and Unknowns

Jonni L. Johnson, Gail S. Goodman, and Peter C. Mundy

Autism Spectrum Disorders (ASD) are neurodevelopmental disorders represented on a continuum of severity and marked by repetitive/restricted behaviors and difficulties in social interactions and communications (American Psychiatric Association, 2013). In this book, we offer integrative, theory-rich, and science-based discussions of how the particular cognitive and social deficits associated with ASD create unique challenges in assessing autobiographical memory, especially in the legal context.

Throughout the book, authors demonstrate why *autobiographical* memory, versus other forms of memory, requires specialized empirical attention and nuanced understanding for individuals with ASD. This is particularly true when individuals with ASD become involved in the legal system. With this consideration in mind, authors discuss how the legal system, with its formal social infrastructure and primary goal of justly balancing the needs of accused and accusers, can meet societal duties of offering appropriate accommodations for individuals with ASD. The discussions will surely spark debate on theoretical, empirical, and ethical conflicts that should be resolved.

Autobiographical memory theories and ASD

Autobiographical memories are recollections of one's past experiences. Memory theorists offer varying definitions of autobiographical memory, but generally such memories give a sense of remembering that the self previously experienced certain events (e.g., "I remember I was sick on my last birthday"), sometimes even mentally reliving what happened as opposed to simply knowing semantic de-contextualized facts about the self (e.g., "I know my birthday is January 14"), although by some definitions both "remembering" and "knowing" are involved in autobiographical memory (Conway & Rubin, 1993). Autobiographical memory is especially distinct in ASD: The scientific evidence, discussed by many of the contributors of this book, reveals autobiographical memory deficits in those with versus without ASD. However, as this is an

emerging field of research, agreement on theoretical mechanisms underlying these shortfalls in memory performance in ASD has yet to be reached.

We have arranged the first section of the book to reflect differing theoretical viewpoints. Part 1 begins with how memory operates or is organized. Gaigg and Bowler address this important topic in their chapter on relational processing theory (Chapter 1), Miller and colleague's chapter offers an alternative view in their application of fuzzy trace theory (Chapter 2), and Williams outlines a third view for information processing and executive function theory that uniquely contends that memory function in ASD is a derivation, not deviation, of memory functioning (Chapter 3). Chapters 4 and 5 provide a specific focus on theoretical mechanisms that may influence autobiographical memory functioning in ASD in the domains of Theory of Mind (Souchay, Ohlsson, & Zalla) and the development of the self (Lind, Williams, Grainger, & Landsiedel), respectively, as both Theory of Mind and self-development are known to be diminished or underdeveloped in ASD. Soper and colleagues' chapter rounds out the section by discussing ways in which multiple mechanisms and individual differences potentially integrate together to influence the functioning of autobiographical memory and how this could create difficulties within the legal system (Chapter 6).

Empirical findings and methodological assessments

Part 2 of the book offers readers thorough summaries of research on autobiographical and eyewitness memory in those with and without ASD. In each chapter, when research is recounted, specific details about the samples are described as possible. For example, information is provided for each study about the samples tested in regard to ASD diagnosis/severity, age, gender, and cognitive functioning levels (e.g., IQ) when such information is available. In most research on autobiographical memory in ASD, individuals who can provide verbal memory reports are assessed, as reflected in the chapters here as well. Although, in the future, research on memory in nonverbal or limited-verbal individuals with ASD will provide vital new knowledge, the legal system largely relies on verbal eyewitness reports, which is our book's focus.

The chapters by Goddard (Chapter 7) and Crane and Maras (Chapter 8) present a developmental perspective on what is currently known about autobiographical memory functioning in children and adults with ASD, respectively. These contributions are then followed by two chapters that review factors known to influence eyewitness memory and eyewitness identification in typically developing (TD) children (Chae, Hobbs, & Bederian-Gardner, Chapter 9) and adults (Wood & Davis, Chapter 10). These chapters are meant to provide grounding in eyewitness memory research, in general, which may be especially helpful for readers who are more familiar with the ASD literature. These chapters reveal that eyewitness memory is not perfect, even in TD individuals. Chae and colleagues, particularly, emphasize how development during childhood can influence memory accuracy. Wood and Davis discuss many issues in adult eyewitness identification research that ASD memory researchers have not begun to address (e.g., influences on the reliability of eyewitness identification). We end this section with a contribution by Carlin (Chapter 11) that offers a critical lens on experimental methodology, demonstrating the field's need for consistent, well-designed, and transparent study findings. Overall, Parts 1 and 2 of the book address theories

and empirical findings of how memory operates in ASD compared to TD individuals, setting the stage for the third and final section of the book that addresses the practical, legal side of this topic.

Investigative tools and legal application

In a legal setting, autobiographical recollection of an experienced event that is criminal in nature is called eyewitness memory. Witnessing a store robbery would require one to tell what the self or others experienced while at the store, ideally in a way that aids in the pursuit of justice. Understanding the accuracy of such memories—their creation, malleability, preservation, and retrieval—is of utmost importance from a legal perspective. In legal application examples, eyewitness memory serves as the basis of a victim's outcry to police officers, forensic interviewers, educators, and clinicians about wrong doings; a witness's testimony during a deposition or hearing; or a defendant's answers to questions during an interrogation.

Unfortunately, some areas of the legal system are unequipped to provide adequate legal services to individuals with ASD and stagnant in instilling ample, appropriate training for legal professionals. Legal professionals have pulled together anecdotal collections and case studies to assist in training investigators on how to interact with and investigate cases involving individuals with ASD (e.g., Taylor, Mesibov, & Debbaudt, 2009), yet they lack important information from scientific studies to facilitate this training (Smith, Polloway, Patton, & Beyer, 2008).

Given this applied need, we have arranged the third part of the book to address existing forensic techniques for interviewing individuals with ASD as well as to address other legal considerations. Brewer and Young (Chapter 12) introduce readers to situations where difficulties arise within the legal system due to misunderstood and misinterpreted characteristics of ASD, highlighting that most of our knowledge on meeting the needs of individuals with ASD in the legal system comes from a few observations and case studies. Thus, providing tools that trained professionals could use to collect accurate eyewitness statements would be a starting point in delivering adequate services to individuals with ASD.

The next three chapters address this starting point by discussing three forensic interview protocols currently in use by professionals. Each chapter outlines the conceptual and research basis of the protocol, and offers suggestions and evidence as to why the protocol may be effective for use with individuals with ASD or may need to be further tested and modified. Richards and Milne (Chapter 13) review the use of the Cognitive Interview protocol in ASD, identifying many of the theoretical mechanisms discussed early on in the book as having influence on the Cognitive Interview's administration. Camparo, Guzman, and Saywitz (Chapter 14) present the Narrative Elaboration Technique highlighting the need to limit cognitive demands on executive functioning and verbal skill when interviewing individuals with ASD. Malloy, Mugno, and Arndorfer (Chapter 15) review the use of the National Institute of Child Health and Human Development (NICHD) Investigative Interview and the Ten-Step Investigative Interview protocols, describing how these protocols may minimize difficulties for those with ASD by addressing the social demands imposed by a forensic interview. Although these latter two chapters describe protocols that have yet to be empirically tested in an ASD sample, the authors provide evidence of the use of

these protocols with children with developmental disabilities. Overall, the authors of the three chapters encourage future researchers to incorporate novel experimental designs examining the efficacy of these protocols for individuals with ASD.

The final two chapters address remaining concerns from clinical and legal points of view. Krackow (Chapter 16) offers a clinical viewpoint, describing such topics as how mandated reporters should respond when collecting eyewitness accounts from individuals with ASD as well as describing how characteristics of ASD (e.g., co-morbidity) present further challenges for mandated reporters. The book ends with several thought-provoking issues, raised by Goldfarb and Gonzalez (Chapter 17), for the legal system to tackle, such as the challenges an individual with ASD would face in taking the stand to testify and whether or not individuals with ASD can tell a lie. These are vital issues that future studies will need to address.

Concomitant Concerns

Overall, from this book, readers will gain a sense of what is known about autobiographical memory in ASD, especially when such memory becomes an eyewitness account as well as a sense of the existing forensic interview tools available. This information is essential so that discourse among researchers, practitioners, and legal professionals results in dissemination of valid, scientific findings. It is also vital for future research in this budding area of psychology.

Yet, on the horizon, looms what we have identified to be two large storms that future researchers must address and that readers should consider. The first consideration is one of urgency: The growing prevalence rate of ASD underscores the importance of future research on topics discussed in the chapters. The second consideration addresses the difficulty of implementing policy changes given a continuously reclassified and heterogeneous population. These considerations, discussed, in turn, next, contextualize evidence presented in this book

Prevalence of ASD

Within the past 20 years, the prevalence rate of ASD diagnoses has increased by more than 200%, from 1 in 150 to 1 in 68 in the United States ("Autism Spectrum Disorder," 2014; Christensen et al., 2012), with increases in prevalence rates also being noted globally elsewhere. This prevalence spike may be indicative of increased awareness of ASD, availability of services, and training to diagnose the disorder as well as a societal acknowledgment of the disorder's spectrum form. These prevalence rates in society foretell increased numbers of individuals with ASD becoming involved in the legal system as eyewitnesses, victims, or perpetrators (e.g., Brewer & Young, 2014; Cheely, Carpenter, Letourneau, Nicholas, Charles, & King, 2012; King & Murphy, 2014). Compared to those without, individuals with disabilities, including ASD, are seven times more likely to have interaction with legal professionals, most often police officers (Debbaudt, 2001), yet empirically derived and scientifically validated tools and trainings to meet these challenges are virtually non-existent.

From a moral standpoint, being ill-prepared to offer accommodations can lead to psychological harm to individuals who are not afforded available means to pursue

justice, and from an economic, risk management standpoint, this can also lead to civil suits. Further, the legal system's possible misinterpretation of statements provided by individuals with ASD raises concerns about false confessions, false allegations, and false imprisonment, all of which hold moral and economic costs. Other societal systems (e.g., educational, medical) have made strides in providing training to their work forces as well as implementing curriculums, services, and general care for individuals with ASD. If the legal system continues to show little recognition of increased ASD prevalence, then it is essentially and knowingly excluding this population from a crucial part of society. Yet, the legal system is quite unique in its need to balance three important forces at once (e.g., needs of the accuser, the accused, and society at large). Thus, the legal system requires *consistent* empirical backing to make changes while remaining balanced. Presently, science falls short of the legal requirement of consistency, as described, in turn, next.

Evolving classification and heterogeneity of ASD

Since its earliest descriptions more than 70 years ago (e.g., Baker, 2013; Masi, DeMayo, Glozier, & Guastella, 2017), ASD has had an ever-evolving classification. Fortunately, professionals have developed a greater understanding of what individuals with ASD are or are not able to do. Only in 1980 did the American Psychiatric Association (APA) include in the *Diagnostic and Statistical Manual for Mental Disorders* (DSM-3) a description of autism disorder as being a *spectrum* disorder. This, in turn, permitted the diagnosis and development of treatment plans for individuals displaying detached emotional responses and difficulties with social communication and interactions. In 1994, the DSM-4 added Asperger syndrome as a separate classification, mainly displaying difficulties in social interaction; however, in the most recent version, the DSM-5 has collapsed Asperger syndrome to be included in the spectrum of autism disorders, described as a higher functioning form of ASD marked with greater verbal abilities (APA, 2013). An examination of the historical classification of ASD is important when thinking through ideas or results described in the chapters, and in thinking about the full challenge for deriving findings to a "group" who, *diagnostically speaking*, may no longer "exist" (for a historical review, see Baker, 2013; Ousley & Cermek, 2014).

For example, the DSM-4, which included the separate classification of Asperger syndrome from autism, distinguished between Asperger syndrome and high-functioning ASD; the former indicated that the main deficit was social interaction and communication, whereas the latter indicated deficits in social interaction and communication coupled with early childhood language delay (Autism Speaks, 2010). Thus, researchers at the time who examined memory abilities in group of individuals with Asperger syndrome did not need to account for how verbal ability might influence participant responses to suggestive questions, but researchers examining these same abilities in a group of individuals with high-functioning ASD would (or should). By today's standard, both groups would be called high-functioning ASD. This has clear implications for determining whether accommodations to limit the cognitive and social demands should be permitted for all individuals with ASD or just those who qualify for assistance. Who will determine who qualifies? Or what level of deficit qualifies for what type of accommodation? How will these variations in accommodations for "the population of individuals with ASD" be perceived by societal members (e.g., jurors)?

The heterogeneity of the ASD population has some researchers arguing in favor of subgroups within the ASD population (e.g., Masi et al., 2017; Ousley & Cermek, 2014). In response, the research community has begun using biomarkers as a way to identify subgroups of the ASD population that respond to certain kinds of treatments as well as experience greater or lesser degrees of difficulties in selective cognitive domains. Biomarkers range from being genetic variations to neurological patterns of activation to aberrant behavioral tendencies. Stratifying the ASD population with biomarkers sounds promising for the field in developing useful tools and training programs that would be supported by psychological theory. Although this use may, in part, limit the generalizability of past research, a definite advantage to identifying accurate subgroups permits formation of appropriate expectations about cognitive and social capabilities. Thus, the field can create more precise tools, services, and training to better meet the needs of individuals with ASD. That said, the hope is that the biomarker approach will result in coherent and useful subgroup classifications.

A similar concern for researchers applying memory findings in ASD to the legal system is accounting for the effects of co-morbid diagnoses, which may further exacerbate ASD symptoms. Individuals with ASD experience co-morbidity with several psychiatric disorders, including attention deficit (hyperactivity) disorder, anxiety disorders, phobias, learning disabilities, depression, oppositional defiant disorder, intellectual disabilities, and conduct disorder (e.g., Salazar, Baird, Chandler, Tseng, O'Sullivan, Howlin, … & Simonoff, 2015; Simonoff, Pickles, Charman, Chandler, Loucas, & Baird, 2008). It is estimated that approximately 70% of individuals experience co-morbid issues (e.g., Mazzone, Rua, & Reale, 2012); others have reported summaries of studies indicating a range from 63% to 96% comorbidity rate (Van Steensel, Bögels, & de Bruin, 2013). Although not a topic thoroughly covered in this volume, we recognize that co-morbidity is an additional concern for researchers moving forward in this field; unfortunately, the effects of co-morbid types is presently overlooked in memory and ASD studies.

Overall, the ever-evolving classification of individuals with ASD, coupled with their hallmark heterogeneity in cognitive and social abilities, delays the development of adequate accommodations, postponing recommendations for policy changes.

Concluding Remarks

The study of memory in ASD is not new (e.g., Boucher & Bowler, 2008), yet many would contend that we are just beginning to understand specifically how *autobiographical* memory develops and operates in ASD. Although the evidence is often presented to argue in favor of different theories and mechanisms, instances of overlap in the cited research of this book demonstrate the dire need for empirical attention to this area of study. Moreover, the legal application of autobiographical memory is relatively new and has had little empirical attention, although interest is currently growing. This emerging field requires an integration of expertise from multiple areas of study: autism, autobiographical memory, and the law.

We are thankful to the contributors of this edited volume whose efforts in summarizing these disparate fields are to be commended. Traversing a new empirical frontier, one with immense ethical considerations, is a daunting task. We hope this book will

propel discussion forward, foster a network of researchers developing expertise in this area of study, and lead to new scientific discoveries that ultimately improve the lives of individuals with ASD.

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Part I

Autobiographical Memory Theories and Autism Spectrum Disorder

1

A Relational Processing Framework of Memory in Autism Spectrum Disorder

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Ever since the seminal studies of Beate Hermelin and Neil O'Connor during the 1960s and 1970s, it has been known that individuals with autism spectrum disorder (ASD), compared to typically developing individuals, learn and remember things differently. They tend not to benefit from meaningful relations among stimuli to facilitate memory (e.g., Tager-Flusberg, 1991), their memory is often void of contextual details that situates past events in a particular place and time in personal history (e.g., Lind & Bowler, 2010a), and they often find it difficult to spontaneously recall information without aids for retrieval (Bowler, Gardiner, & Berthollier, 2004). At the same time, many individuals with ASD can also demonstrate exceptional memory skills. Autistic savants such as Stephen Wiltshire, for example, draw cityscapes in intricate detail following just a few minutes of exposure (Treffert, 1988, 2009)[1] and although such eidetic memory is rare, it is not uncommon for individuals with ASD to demonstrate superior rote memory skills (Hermelin & O'Connor, 1970)[2] or to remember details of events that would escape almost everyone else (e.g., Grandin, 2006). This pattern of strengths and difficulties is neither a unique nor a necessary feature of ASD, but interest in this topic is growing because of the functional consequences that memory difficulties can have for an individual. This is, perhaps, nowhere as evident as in the context of the criminal justice system.

Whether it is as a victim, witness, or even a suspected perpetrator of crime, individuals who come into contact with the criminal justice system will often be required to provide accurate accounts of past events that should be rich in relevant detail and provide a coherent narrative of the unfolding of events over time (i.e., who did what

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[1]   See also http://www.stephenwiltshire.co.uk/

[2]   *Rote memory* describes memory for material that is relatively meaningless, either by virtue of the material per se (e.g., abstract shapes; arbitrary sequences of letters, numbers, or words), or by virtue of the relations between the material and its context (e.g., remembering train time-tables without a need to travel on relevant routes).

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to whom, where, and when). Recent evidence is beginning to shed light on how individuals with ASD cope with such demands and how their particular profile of memory strengths and weaknesses impacts their ability to give evidence. To provide a broader context for this emerging literature, the present chapter provides an overview of the memory profile in ASD from the perspective of the distinctions between *relational* and *item-specific* memory processes on the one hand, and between *recollection* and *familiarity* on the other. After a brief introduction to these distinctions, three lines of evidence are summarized, which suggest that *relational* memory and *recollection* are compromised in ASD whereas *item-specific* memory and *familiarity* are relatively preserved. A final section then considers what the implications of this pattern are for how individuals with ASD should be supported in the context of the criminal justice system. It is important to note, however, that the evidence summarized in this chapter primarily concerns individuals with ASD who do not have significant intellectual and/or language impairments.

Distinctions in memory

It is now well established that our ability to remember the past is the result of a number of interacting processes that govern how memories are initially formed, how securely they are retained, and how likely it is that they can be retrieved at a later stage. A detailed overview of the various distinctions that have been drawn in this context is beyond the scope of this chapter (see Neath & Suprenant, 2003, for comprehensive overviews). Instead, we focus on two related distinctions that have proven useful for understanding the memory profile associated with ASD: between *relational* and *item-specific* processing on the one hand, and *recollection* versus *familiarity* on the other.

The distinction between relational and item-specific processing was first formalized in a pair of publications by Einstein and Hunt (1980) and Hunt and Einstein (1981) to integrate two influential perspectives of the time about which information people needed to process effectively in order to ensure successful memory. One view held that memory crucially depended on the processing of commonalities between to-be-remembered elements or events, which could serve to organize material around a common theme that would subsequently aid retrieval (Tulving, 1966; Tulving & Patkau, 1962). Evidence for the operation of such organizational processes stemmed from the observation that participants generally remembered sets of interrelated items better than unrelated items (Cofer, 1965; Hyde & Jenkins, 1969) and that this memory advantage was predicted by the extent to which participants spontaneously organize to-be-remembered stimuli into clusters of categorically (e.g., fruit) or associatively (e.g., table-chair) related items during retrieval (Tulving, 1962, 1966). There was also evidence for a rather different view, however, which emphasized the processing of the unique details of to-be-remembered stimuli as important for successful memory. Specifically, it was well established that memory is better when stimuli are processed for their meaning instead of their perceptual properties (e.g., Tresselt & Mayzner, 1960). According to the *Levels of Processing* (LoP; Craik & Lockhart, 1972) account, this is because meaning is represented at a deeper level of an information processing hierarchy than more superficial perceptual information, and deeper levels of processing render memory traces more elaborate and distinct, and thus, more readily accessible for retrieval.

Organizational and LoP accounts of memory seemed antithetical because they each emphasized the processing of *relational* versus *item-specific* information as important for successful memory. However, Einstein and Hunt (1980) argued that both processes could be operating in parallel and contribute independently to successful memory. They argued that the extent to which people spontaneously process either type of information depends on the nature of the to-be-remembered material. Highly interrelated stimuli, such as categorically related words or objects that are commonly found together in a particular room, would naturally encourage relational processing, whereas stimuli that are more distinctive (e.g., a knife in a bathroom rather than a kitchen) would encourage item-specific processing. Einstein and Hunt (1980) reasoned that if both types of information contribute independently to successful memory, encouraging relational processing should be most effective for material that would spontaneously give rise to item-specific processing. Conversely, encouraging item-specific processing should be most effective for material that would otherwise stimulate relational processing. These predictions were confirmed in a series of experiments in which participants were asked to study lists of related and/or unrelated words under conditions that either drew attention to relational (e.g., sorting words into categories) or item-specific (e.g., rating words on pleasantness) information (Einstein & Hunt, 1980; Hunt & Einstein, 1981; Hunt & Seta, 1984). In all experiments, words that were obviously related were better remembered following item-specific processing, whereas less obviously related words were better remembered following relational processing. It is interesting to note that memory was best overall when participants engaged both processes together, confirming that relational and item-specific information contribute *additively* to memory success. Another important observation was that study instructions that directed participants' attention to relational information were most beneficial for facilitating their ability to freely recall material, whereas instructions that directed attention to item-specific information were most beneficial for their ability to discriminate studied from non-studied items in tests of recognition (Einstein & Hunt, 1980) or to retrieve items in response to cues such as category labels (Hunt & Mcdaniel, 1993; Hunt & Smith, 1996). This finding was important because it established a functional independence between relational and item-specific processing with the former serving an organizational function that can guide unaided retrieval (e.g., Tulving, 1962, 1966), while the latter serves a discriminative function that renders items more distinct, and thus, more easily identifiable on tests of recognition or accessible in response to relevant cues. To put this into context, relational processing would be expected to enhance an eye-witnesses ability to freely describe the appearance of a perpetrator of a crime or any weapons or objects that may have been involved. By contrast, item-specific processing would be expected to benefit the identification of a perpetrator among similar individuals in a line-up, or to identify a specific knife among many as the weapon involved in a crime.

Since the early studies of Hunt and colleagues, a wealth of behavioral and neuropsychological evidence has accumulated to support the distinction between relational and item-specific processing (Davachi, 2006), which has proved useful not only for explaining typical memory functions, but also the memory difficulties that are associated with older age (Old & Naveh-Benjamin, 2008) and disorders such as schizophrenia (Ranganath, Minzenberg, & Ragland, 2008) and ASD (e.g., Bowler, Gaigg, & Lind, 2011). A complementary distinction that has proven equally useful in these contexts is that between *recollection* and *familiarity,* which differentiates

between distinct ways of retrieving memories rather than the processes involved during memory formation. Recollection describes the retrieval of contextually rich memories that involve details about where, when, and how a particular experience occurred and how different elements of that experience relate to one another. A prototypical example of recollection is brought to life in Marcel Proust's *In Search of Lost Time* (1946), where the protagonist, upon tasting a Madeleine, re-lives the following experience from his childhood (see also Hobson & Hermelin, 2008):

> And suddenly the memory revealed itself. The taste was that of the little piece of Madeleine which on Sunday mornings at Combray (because on those mornings I did not go out before mass), when I went to say good morning to her in her bedroom, my aunt Léonie used to give me, dipping it first in her own cup of tea or tisane (p.68).

In contrast to such vivid recollections, familiarity describes the process of retrieving knowledge that is not bound to a particular place or time in our past such as knowing the boiling point water, or recognizing our butcher on the bus without realizing where we know him from. As these descriptions suggest, the distinction between recollection and familiarity is closely related to that between relational and item-specific processing in so far as that recollection involves the retrieval of relational information whereas familiarity is primarily based on the retrieval of item-specific information. Although there are nuances to this parallel that are beyond the scope of this chapter (see Mayes, Montaldi, & Migo, 2007), considerable evidence corroborates a close link between these processes. First, neural evidence indicates that the brain areas that support relational processing during memory formation are also involved in retrieval in the form of recollection while the areas that support item-specific processing are involved in retrieval in the form of familiarity (Davachi, 2006; Mayes et al., 2007). In other words, the brain mechanism recruited by both relational processing and by recollection is different from the one broadly shared by item-specific processing and familiarity. This particular pattern of functional separation and overlap is further supported by evidence from several patient populations who demonstrate parallel impairments in relational processing and recollection while item-specific processing and familiarity are spared (Ragland et al., 2012). Perhaps more relevant for the present purposes, evidence also shows that recollection critically underpins free recall, whereas recognition memory can be mediated by recollection or by familiarity (see Yonelinas, 2002). Returning to the earlier example above, witnesses might be able to pick out a perpetrator from a line-up because one of the individuals feels distinctly more familiar or because they can recollect seeing that individual in the specific context of the witnessed crime (e.g., where they stood, what they wore, who they were arguing with, etc.). By contrast, a sense of familiarity would not suffice for witnesses to freely describe the appearance of a perpetrator because such a description would critically depend on the ability to recollect the combination of details (skin tone, height, eye color, etc.) that identify a specific individual.

To sum up these somewhat tedious technicalities, the processing of relations among the elements of unfolding events serves to organize material in memory, which is particularly important when we subsequently try to freely recall the events or bring back to mind rich contextual detail (i.e., recollection). The processing of individual elements of events, by contrast, serves to aid the discrimination of previously encountered versus new material on tests of recognition through a sense of familiarity. In most

situations, people process both relational and item-specific information in parallel, and thus, retrieve memories through a combination of recollection and familiarity. However, as the following sections illustrate, several lines of evidence suggest that individuals with ASD may find it relatively more difficult to process relational than item-specific information, and therefore, rely more heavily on familiarity rather than recollection when retrieving past events.

Familiarity, recollection, and remembering the personal past

A general observation in memory studies of individuals with ASD is that they tend to experience greater difficulties on tests of free recall than tests of recognition or cued recall (Boucher, Mayes, & Bigham, 2012). In its own right, this pattern suggests greater difficulties with retrieval through recollection than through familiarity, but there is also more direct evidence for this dissociation. Specifically, several studies have taken advantage of the fact that the distinction between recollection and familiarity is respected in natural language where we differentiate between events that we *remember* and facts that we *know*. In a typical experiment that draws on this distinction, participants would be asked to study a set of stimuli, and subsequently, indicate whether they *remember* or *know* the items they recognize. Participants are told that remembering must entail recognition of the item along with additional contextual information, such as remembering where, when, or how it was presented, or remembering any thoughts that might have come to mind at the time of studying it. Knowing, by contrast, must entail recognition of the item without any additional contextual information.

The "Remember/Know" paradigm has been used extensively in the study of typical memory function (Gardiner, 2001; Gardiner, Ramponi, & Richardson-Klavehn, 2002; Yonelinas, 2002), and several studies of ASD have revealed relatively specific difficulties with remembering but not knowing (Bowler, Gardiner, & Gaigg, 2007; Bowler, Gardiner, & Grice, 2000; Cooper et al., 2015; Souchay, Wojcik, Williams, Crathern, & Clarke, 2013). For example, Bowler, Gardiner, and Grice (2000) asked participants with and without ASD to study a list of high- and low-frequency words, and found that the ASD group reported fewer remember but more know experiences than comparison participants. Both groups demonstrated a well-established word-frequency effect, whereby low-frequency words were better remembered than high-frequency words, and only recognition in the form of remembering but not knowing was affected by word frequency in both groups. This observation was important because it confirmed that experiences of remembering were quantitatively reduced but not qualitatively different in ASD compared to non-ASD participants, which was further corroborated by Bowler, Gaigg, and Gardiner (2008) across three experiments (but see Massand & Bowler, 2015; Massand, Bowler, Mottron, Hosein, & Jemel, 2013, for relevant neurophysiological data). In other words, when individuals with ASD say that they "remember" or "know" something, they tend to describe qualitatively similar experiences to individuals without ASD. Souchay et al. (2013) further extended this finding to recognition memory for pictures, where individuals with ASD again reported fewer remembering experiences in the context of overall preserved levels of recognition. Finally, Tanweer, Rathbone, and Souchay (2010)

showed that even when individuals with ASD retrieve experiences about their personal pasts, they are less likely to *remember* these experiences in vivid contextual detail while they have no difficulties *knowing* which events occurred. This last finding has been replicated across a number of studies investigating autobiographical memory retrieval (Crane & Goddard, 2008; Crane, Goddard, & Pring, 2009; Crane, Lind, & Bowler, 2013; Lind & Bowler, 2010b; Lind, Williams, Bowler, & Peel, 2014). Such findings carry the important implication that witnesses with ASD can be expected to "know" what they have witnessed even if they would have difficulties furnishing this knowledge with concrete contextual detail. Converging evidence from so-called source memory studies lend further support to this conclusion.

In a typical source memory experiment, participants are asked to study items that are presented in different formats or contexts. For instance, stimuli might be presented in different fonts, in different locations on a screen, in different lists or by different people. Alternatively, participants might be asked to do different things with the stimuli such as simply reading them, thinking about actions related to them or generating rhymes. The former constitute examples of *external* source information in that the participant plays no active role in influencing the contextual details that define the presentation of the item. The latter constitute *internal* source information because the participants' thoughts or behavior define the context under which the items are studied. In line with the observation of attenuated recollection in other paradigms, a number of studies have shown that individuals with ASD often have difficulties remembering such contextual details (Bigham, Boucher, Mayes, & Anns, 2010; Lind & Bowler, 2009; Ring, Gaigg, & Bowler, 2015; Russell & Jarrold, 1999), particularly when these details need to be freely recalled. For instance, Bowler et al., (2004) asked participants to study lists of words either by actively performing one of four encoding tasks (e.g., think about a rhyme) or by passively studying words that were presented on the top or bottom of the screen or in a male or female voice. On a subsequent recognition test, participants first needed to indicate whether or not they recognized words from the previous study lists. If they did, they were then either asked to recall how the word was presented or what encoding task they had performed, or to choose the relevant contextual detail from a list. The findings showed that individuals with ASD were worse than comparison participants at recalling contextual details, but they were as good as comparison participants in recognizing them. Bowler, Gaigg, and Gardiner (2015) extended this observation to show that ASD participants benefit significantly more than a comparison group from retrieval support to remember in which of three screen locations words had been studied earlier. Similarly, difficulties in recalling the sequential order in which dots are presented on a screen are also ameliorated in ASD when relevant screen locations are highlighted for the participant to choose from (Bowler, Poirier, Martin, & Gaigg, 2016). In other words, whereas the free recall of contextual source information often proves difficult for individuals with ASD, source recognition often does not, which is generally in line with difficulties in recollection rather than familiarity processes during retrieval.

Although the evidence outlined thus far suggests that ASD is characterized by difficulties with recollection but not familiarity during memory retrieval, none of the studies outlined above provide evidence that this difference is linked to abnormalities with the processing of relational versus item-specific information during memory formation. The next sections set out evidence that addresses this issue directly, but first