CHAPTER I

The Emergence of the Developmental
Science of Memory
A Festschrift for Peter A. Ornstein

Lynne E. Baker-Ward, David F. Bjorklund, and Jennifer L. Coffman

This volume had its origins in a celebration. In May 2019, dozens of Peter Ornstein’s former and current students, colleagues, and friends gathered to commemorate a significant milestone. After 45 years on the faculty of the University of North Carolina at Chapel Hill and a total of 100 semesters in academia, Professor Ornstein had accepted emeritus status as the F. Stuart Chapin Distinguished Professor of Psychology and Neuroscience. In addition to social activities, including a lively roast and the announcement of a distinguished professorship named in Ornstein’s honor, the festivities involved a series of scientific talks by alumni of his laboratory. Ornstein’s four distinct programs of research formed the organizational structure for these presentations, with each topic represented by an overview of his work and a description of on-going research that continued and extended the original contributions. It was immediately apparent that Ornstein’s 50-year research career not only reflected advancements in the understanding of memory development but also constituted a driving and enduring force in the field. This edited volume, structured around Ornstein’s separate but interrelated programs of research, provides a perspective on the emergence and growth of the developmental science of memory as well as a Festschrift for a widely revered academician.

The Developmental Context

There is continuity as well as change in Peter Ornstein’s scientific development. He was trained as an experimental psychologist, earning his PhD under the direction of David A. Grant at the University of Wisconsin–Madison in 1968. As discussed by Brian Cox (Chapter 2), Ornstein’s initial research exemplified the on-going transition in psychology from verbal learning to information processing. Whereas work in the Ornstein Laboratory moved over the decades from the application of a mechanistic model emphasizing control processes to a more sociocultural approach
addressing interactions with others as a source of change in memory development, his rigorous training as an experimental psychologist has been consistently apparent in his research. With his students, he devoted attention to the conduct of investigations that incorporated appropriate control conditions and careful procedures, built in replications of previous findings, and provided systematic extensions of prior studies, as exemplified throughout this volume.

Pronounced change is notable alongside this continuity. Ornstein’s scientific identity formally shifted from experimental psychology to developmental psychology when he moved from Princeton University to the University of North Carolina at Chapel Hill (UNC-CH) in 1973. However, corresponding to changes within the field, Ornstein’s approach to developmental psychology changed dramatically over time. He made a transition from a more experimental-child approach, with an emphasis on identifying age differences in a particular independent variable, to an increasingly well-articulated focus on understanding the process of development and the factors that drive it. As described in an influential article (Ornstein & Haden, 2001a), this approach addressed the development of memory in comparison to memory development. In Chapter 3, Catherine A. Haden provides an update of this report, with an emphasis on longitudinal research and the role of parent–child interactions in the development of skilled remembering over time. Her discussion documents the central contributions of work conducted by researchers trained in the Ornstein Laboratory in advancing the understanding of the development of memory.

The colleagues whom Ornstein came to know in Chapel Hill were instrumental in his continuing growth as a developmental psychologist. Harriet L. Rheingold, who served as a research professor at UNC-CH from 1964 to 1978, was an internationally recognized scientist whose work emphasized bidirectionality in the interactions between mothers and infants (see Lipsitt & Ornstein, 2002). This focus on young organisms as competent and active, rather than the passive recipients of stimulation, represented a profound change in the field (see Sameroff, 2009). Robert B. Cairns, with whom Ornstein worked closely from the time he arrived at UNC-CH until Cairns’s death in 1999, was instrumental in establishing developmental science. This perspective emphasized the importance of multidisciplinary approaches to the study of development over time, the incorporation of multiple levels of analysis in understanding stability and change, and the vital importance of applied contributions (see Cairns, Elder & Costello, 1996). Cairns’s roles as a cofounder of the Carolina...
Consortium on Human Development in 1989 and subsequently as the founding director of the Center for Developmental Science in 1994 provided Ornstein with a stimulating community for the exploration of development. The Center tangibly contributed to Ornstein’s work through the support of postdoctoral fellows, including Catherine A. Haden (Chapters 3 and 12), Amy M. Hedrick (Chapter 11), and Heather L. Price (Chapter 8), as well as a number of predoctoral students. Representing the latter group in this volume are Jennifer L. Coffman (this chapter, Chapters 4 and 15), Jennie K. Grammer (Chapter 17), Kesha N. Hudson (Chapter 16), and Taylor E. Thomas (Chapter 7).

In addition to his important relationships with local colleagues and students, Ornstein has long enjoyed a rich network of national and international colleagues. Four of these distinguished researchers – Wolfgang Schneider, Maggie Bruck, Robyn Fivush, and Fredrick J. Morrison – have each provided a valuable commentary on the research program most closely aligned with their work. We are grateful to them for sharing their expertise. A final chapter, authored by David F. Bjorklund, whose dissertation was directed by Ornstein, discusses advances in the conceptualization and application of memory development over the past 50 years and examines the impact of this work on the understanding of cognitive development broadly defined.

The great importance of his professional colleagues notwithstanding, Ornstein’s understanding of development has also certainly been inspired and informed at home. Marilyn Reichwald Ornstein, his spouse of 55 years, is a highly regarded early childhood educator whose contributions have extended well beyond her own classrooms. The Ornsteins have reared two exceptional daughters who share their parents’ commitment to careers involving children. Miriam Ornstein has followed in her mother’s footsteps in early education, and Naomi Ornstein Davis is a clinical psychologist. The Ornsteins are active participants in the lives of their five grandchildren.

The Research Programs

Ornstein’s body of work falls easily into four extensive programs of research, each addressing age-related changes in skilled remembering and reflecting increasing attention over time to the development of memory (see Haden, Chapter 3). These endeavors both addressed highly salient contemporary questions, reflecting the field at the time, and contributed to the understanding of the issues under examination, furthering the study of
memory development. The quality of each program is indicated by the continuing extramural funding that supported the work, and the impact of the research is reflected in part by the large number of publications – over 150 – listed on Ornstein’s CV.

These four programs are discussed in turn in Parts II through V of this book. Each part begins with an overview of Professor Ornstein’s research provided by former PhD or postdoctoral students who contributed to the body of work. Additional chapters in each part, also authored by a former Ornstein student or a researcher trained by a former trainee (i.e., an Ornstein “grand-student”), provide contemporary perspectives on the issues under examination. Some of these chapters include work that directly builds on the research discussed in the overview, whereas others discuss applications of the accumulated knowledge to novel research problems or to practice. Each part concludes with a commentary by a distinguished scholar in the field. These commentaries elucidate the contributions of the research to the emerging understanding of the development of memory over the past half-century.

*Children’s Memory Strategies*

Ornstein’s initial research as a developmentalist addressed age-related changes in children’s deliberate remembering. This work conveyed an understanding of children as active thinkers, developing techniques such as rehearsal and organization for remembering items, as well as the role that children’s world knowledge has upon their memory. An overview of this research is presented by two Ornstein PhDs, Deborah L. Best and Trisha H. Folds-Bennett. Alena G. Esposito, who is an Ornstein “grand-student,” and Patricia J. Bauer continue the investigation of prior knowledge, emphasizing the way that knowledge representations are built, remodeled, and updated as a function of additive learning. Wolfgang Schneider, an internationally recognized expert in memory development, provides the commentary on the chapters included in this part.

*Children’s Event Memory*

A subsequent focus of Ornstein’s research was on children’s abilities to report personally experienced events involving some degree of stress or discomfort. A particular goal of this research, motivated by societal issues, was understanding the implications of developmental changes in memory capabilities on young children’s involvement as witnesses in legal
Emergence of Developmental Science of Memory

proceedings. The work of Ornstein and his students and collaborators contributed substantially to a better understanding of the development of autobiographical memory and contributed to changes in how children are interviewed in legal contexts (see Cox, Chapter 2; Bruck, Chapter 10). Lynne E. Baker-Ward, an Ornstein PhD, and Taylor E. Thomas, a recent doctoral graduate who is Ornstein’s last formal advisee, provide an overview of this research. In the second chapter in this part, Heather L. Price, a former Ornstein postdoctoral fellow, and Deborah L. Connolly explore continuing basic research on children’s memory for instances of repeated events and the legal context to which such knowledge is applied. In the third chapter of this part, Gabrielle F. Principe, who earned her doctorate under Ornstein’s supervision, summarizes a programmatic series of studies that examines how conversations with peers and adults can shape children’s recollections. This work complements Ornstein’s primary focus on children’s provision of accurate information under specific conditions. Maggie Bruck, an expert in children’s eyewitness memory and suggestibility, shares her perspective on this research in the commentary, emphasizing the forensic relevance of the research.

Family Socialization of Memory

Reflecting his increasing commitment to developmental science, Professor Ornstein next initiated longitudinal research programs elucidating the socialization of memory. One area of inquiry examined the contributions of language-based interactions within the family on the origins and development of children’s skills in independent remembering. Professor Ornstein with his students and colleagues identified important linkages between “joint talk” in parent–child conversations about previous and ongoing events and preschoolers’ developing skills in reporting their experiences. His former postdoctoral fellow, Amy M. Hedrick, summarizes research on young children’s emerging language and memory skills and their socialization through conversations with adults. Another former postdoc, Catherine A. Haden, and her doctoral students, Diana L. Acosta and Lauren C. Pagano, examine an extension of the original research – an exploration of how parent–child conversations about experiences in museums can advance children’s learning and retention of STEM knowledge. In the third chapter of this part, Hillary A. Langley and Jennifer L. Coffman, two Ornstein PhDs, and Andrea M. Hussong examine parent–child conversations within the context of the development of gratitude. This work emphasizes the significance of components of
autobiographical memory, as established through such conversations, for interpreting the past and forming expectations for the future. Robyn Fivush, whose own extensive research was foundational in the study of the family socialization of memory, discusses the implications of this research.

Classroom Socialization of Memory

In his most recent work, Professor Ornstein began a second longitudinal investigation, addressing the influence of teacher–child interactions within the elementary school classroom on children’s subsequent capabilities in deliberate memory. His former doctoral student and continuing collaborator in this endeavor, Jennifer L. Coffman, and her graduate student Olivia K. Cook, contribute the overview of this research program, charting the evolution of this work across longitudinal and experimental designs and toward the possibility of creating interventions that could influence classroom teaching as well as children’s learning. Another Ornstein advisee, Kesha N. Hudson, along with Keadija C. Wiley and Jennifer L. Coffman, present research that extends the original findings to mathematics by demonstrating that the types of language parents and teachers use during the course of instruction and conversation affect children’s academic performance in this domain. In the third chapter in this part, Jennie K. Grammer, who earned her doctorate under Ornstein’s direction, and her student (and Ornstein “grand-sudent”) Remi Torres discuss research that establishes links between memory skills and self-regulated learning as assessed through both behavioral and neuropsychological measures and examine the relation between aspects of teacher language and children’s self-regulated learning skills. Fredrick Morrison, a highly influential researcher in developmental psychology and education, shares his expertise in providing a perspective on these chapters and Ornstein’s career.

Although these programs of research clearly mark transitions in Ornstein’s career-long development as a scholar and constitute distinct epochs in his work, their interconnectedness is notable. The early research on memory strategies, as summarized by Best and Folds-Bennett (Chapter 7), not only informs contemporary investigations of learning and knowledge and the applications of these findings as discussed in Part II but is also integral to on-going research on the classroom socialization of memory, as reviewed in Part V. Similarly, research on the socialization of memory within the context of the family, as presented in Part IV, informs
Emergence of Developmental Science of Memory

A lively, on-going program of research on children’s suggestibility, as reviewed by Principe (Chapter 9), as well as the work on the ways in which teacher talk influences children’s memory performance, as examined in Part V. This integration of knowledge across research programs motivated by different questions reflects Ornstein’s scholarly commitment to understanding the development of memory throughout his career (see also Haden, Chapter 3).

Generativity across Contexts

A review of his work readily establishes that Peter Ornstein has been a meticulous and creative researcher who has modeled intellectual generativity in all his scientific endeavors. In even briefly examining the full extent of his accomplishments, it is clear that his contributions to the profession and to broader society have extended well beyond the laboratory. Ornstein has been a dedicated citizen of his institution and his discipline throughout his long career. Notably, at UNC-CH, Ornstein completed several terms as coordinator of the developmental area, served as department chair, and fulfilled multiple leadership roles within the Center for Developmental Science from its very beginning. His professional service, along with other activities, included his dedicated work as an associate editor for the journal Developmental Psychology, his active membership on the American Psychological Association’s (APA) Publications Committee (which included his advocacy for the Oxford comma), and his involvement with APA’s Division 7.

Ornstein’s commitment to “giving psychology away” was particularly apparent with regard to his research on children’s event memory, which he undertook in response to the urgent needs of legal and clinical professionals to better understand children’s testimony in legal proceedings (see Chapters 2 and 7). His scientific expertise and personal integrity enabled him to fulfill the demanding role of co-chair of the American Psychological Association’s Working Group on the Investigation of Memories of Childhood Abuse and to play a key role in the dissemination of its findings to the profession (see APA Working Group on Investigation of Memories of Childhood Abuse, 1998). Given his expertise and professional accomplishments, he was soon in demand as an expert witness, and as discussed by Bruck (Chapter 10), reluctantly took on this role because he believed it was his responsibility to do so.

The importance of these components of his legacy notwithstanding, Ornstein’s generativity is particularly apparent in his work with students.
across settings and time. Ornstein has been a dedicated and successful classroom teacher, but it seems fair to say that his most important teaching has occurred within the context of his on-going investigations. His teaching and research have been beautifully integrated. Each of Ornstein’s research programs has involved students who were the fortunate recipients of not only his extraordinary skill and insights but his dedicated guidance and multidimensional support. With the research training he provided and his model of a fully engaged career, Ornstein’s students have gone on to make their own significant contributions to the field of cognitive development. Evidence that their experiences in the Ornstein laboratory were formative is apparent in his former students’ continuing contributions to issues they first addressed under his direction, as represented in this book. The authors and coauthors of the chapters in this volume include ten researchers who earned their doctorates under Ornstein’s direction between 1976 and 2020, and three former postdoctoral trainees. In several cases, pre- and postdoctoral students’ involvement in these research endeavors evolved into sustained collaborative endeavors, with former students emerging as full partners who served as principal or co-principal investigators. As these contributors will attest, Ornstein valued his students’ ideas even when they were in the early phases of their training, and the further articulations of his research questions reflect his students’ and postdoctoral fellows’ contributions to on-going research. Ornstein has often quoted Rabbi Hanina, who said, “I have learned much from my teachers and more from my friends, but the most from my students” (Talmud Bavil Ta’anit 7a).

As Ornstein’s former students, we hope the readers of this volume – including Peter himself! – find new information and insights that enrich their understanding of the development of memory.
CHAPTER 2

Mechanism or Meaning?
The Ornstein Lab and Memory in Historical Context

Brian D. Cox

Over a century of memory research has swung between the two poles of the mechanistic model of Ebbinghaus (1885/1913) and the adaptive, sociocultural, and organismic view of Bartlett (1932), neither of which were developmental. The Ornstein Lab has, over the last half century, with experimental rigor, explored how growing children use memory adaptively in meaningful contexts. To begin this book commemorating and analyzing the 83 years of contributions of Peter Ornstein and his collaborators to the study of memory development, it is important to take a long view. As it is the job of later contributors to go through his oeuvre in detail, this chapter will focus on the really long view of historical changes in conceptualizations in memory that preceded his work, provided conceptual underpinnings during it, and continue to this day.

Peter Ornstein began his career in the Hullian behaviorist paradigm and published some work on verbal classical conditioning of differential eye-blink response (Perry et al., 1971). This work was completed in the waning days of the hegemony of conditioning and learning just as that paradigm was shifting. From the transitional era of “verbal learning” in the 1950s to the cognitive revolution of the information-processing period in the 1980s, models of memory focused on the deployment and control of strategic processes of remembering that operate to store and retrieve memory content, models that, despite their modern sophistication, owe something to Ebbinghaus. But children grow up ecologically embedded in cultural structures of meanings, ranging from the doctor’s office to the courtroom, aided or hindered by the people in them, intent on helping developing children to use memory adaptively within those cultural narratives. The purpose of this chapter is not to review all of the specific research of the

---

1 Indeed, Peter told me that the fall from grace of Hullian theory was so complete that in the late 1970s, he found one of Hull’s major works on a bookstore remainder table for 9 cents!
Ornstein Lab but instead to describe the historical shifts that carried it along and to which it significantly contributed.

“Memory Proper” Separated from “Reminiscence”: Ebbinghaus and the Pure Mechanisms of Memory

The nonsense material, just described, offers many advantages, in part because of this very lack of meaning. First of all, it is relatively simple and relatively homogeneous. In the case of the material nearest at hand, namely poetry or prose, the content is now narrative in style, now descriptive, or now reflective; it contains now a phrase that is pathetic, now one that is humorous; its metaphors are sometimes beautiful, sometimes harsh; its rhythm is sometimes smooth and sometimes rough. There is thus brought into play a multiplicity of influences which change without regularity and are therefore disturbing. Such are associations which dart here and there, different degrees of interest, lines of verse recalled because of their striking quality or their beauty, and the like. All this is avoided with our syllables. Among many thousand combinations there occur scarcely a few dozen that have a meaning, and among these there are again only a few whose meaning was realized while they were being memorized (Ebbinghaus, 1885/1913, p. 23).

The experimental study of memory has undergone several paradigm shifts since it began 135 years ago in the work of Hermann Ebbinghaus (1885/1913), whose habilitationsschrift Über das Gedächtnis (On Memory) bears the literal signature of Hermann Helmholtz (Cahan, 2019) and deliberately follows in the footsteps of Gustav Fechner. Ebbinghaus’s methods, which separated the mechanisms of memory from meaning, provided the metatheory not only for the memory-drum period of verbal learning but also for the information-processing period that succeeded it.

According to Danziger’s masterful history of memory, Marking the Mind (2008), Ebbinghaus was well aware that the memory processes for which he justly became famous were not all of memory. In fact, he made a distinction between Erinnerung (reminiscence, self-conscious recollection) and das bloße Behalten, das eigentliche Gedächtnis (mere retention, pure retention, memory proper; Danziger, 2008, p. 128; his translations). Ebbinghaus’s forgetting curves refer only to the second kind of remembering, and it is this kind of meaningless “memory proper” that has come down to us in memory experiments, as a mechanism that is underneath meaning or a carrier of it. As is well known, he painstakingly created 2,300 pronounceable “nonsense” trigram syllables grouped into lists that he used