

Preface

Developmental science is generally defined as the study of cognitive, social, and other behavioral processes that emerge and change in human beings from conception through death. Thus, the relevant phenomena within developmental science begin with the post-conception emergence of the nervous system, the sensory systems that provide the nervous system with information, the muscle systems that allow the nervous system to produce behavior, and the mechanisms whereby early experience shapes the developing brain and is stored as representations and changes in how information is processed. Developmental scientists categorize the emergence and change of these components into separate domains such as cognitive development, language development, emotional development, social development, developmental disorders, etc. Theoretical approaches to developmental science often identify a progression of age-related or ability-related stages within each of these areas, and focus on typical development with some acknowledgment of individual differences, particularly at extremes labeled “atypical development” or “developmental psychopathology.” Other prominent issues within developmental science include innate versus acquired knowledge, environmental influences, social influences (e.g., parenting, peer relations), nutrition, the effect of formal education, epigenetics, etc.

A general characterization of developmental science can be used to identify many of the challenges that developmental scientists face, but contrasting the phenomena addressed by developmental science with the phenomena addressed by physical science also helps us see the challenges. A useful first step toward identifying these challenges is to cite Paul Meehl, a psychologist who is well known for persistently and persuasively addressing problematic aspects of research methodology. In a lecture that he delivered at a meeting of the American Psychological Association over three decades ago (Meehl, 1978), which I believe should be required reading for all developmental scientists, Meehl described 20 reasons why psychology is a difficult topic and all of these difficulties are relevant for developmental science. Unfortunately,

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researchers who are interested in developmental science still face these issues, and many of us are disappointed in our lack of progress in solving them. Other prominent critics have also articulated challenges. I will not reiterate all of these challenges here, but my goal in this book is to address our challenges and to help us navigate toward solving them.

It has been difficult to find an appropriate title for this book. The primary topic of the book is research methodology in developmental science, but I have not written it as an introductory textbook that teaches students the basic skills needed to conduct developmental science research. I describe many essential skills such as measuring psychological phenomena, assessing reliability and validity, designing experiments, recruiting participants, conducting data analysis, drawing conclusions, etc. However, my goal in this book is to provide a broader perspective that offers my fellow developmental scientists some interesting, important, and innovative ideas to ponder as they plan, conduct, analyze, and interpret their research. I am attempting to speak to a broad audience. The young extreme of the audience includes students who are advanced undergraduate psychology majors and assistants in research laboratories and who hope to conduct independent research someday. The old extreme of the audience includes ready-to-retire developmental scientists (like me) who have played the research game so long that they feel empowered, if not obliged, to point out research methodology mistakes that could be corrected. The salient center of the audience contains graduate students and young professionals who are launching their research-oriented careers in developmental science. My decades of dialog with this group have set the tone of voice that I will use in this book.

Although my suggestions obviously make me sound like an opinionated curmudgeon at times, I prefer to see myself as more of a pluralistic meliorist, as defined by my role model William James. I am confident that we can improve our world if we work toward its betterment and that we have an obligation to do so. My goal is to express my suggestions in a way that will contribute to our ongoing dialog about how research in developmental science can be improved, and I am trying to do so with a perspective that includes my crazy/creative insights and also my openness toward learning from my own mistakes and adjusting my own strategies when I can improve them.

My view of research methods is strongly affected (and probably biased) by my own research interests and experience. My primary research interest has been infant cognitive development and how cognitive abilities change over the first years of life. Within the broad palette of infant cognitive abilities, I have been particularly interested in the typical and atypical development of memory, attention, language, categorization, perception, etc. and how these phenomena

are influenced by experience and various aspects of the environment. I have also been involved in several collaborations regarding parent perception of infant intentionality and how this aspect of parenting behavior can be related to child maltreatment and abuse. Finally, I have collaborated in many research projects on autism spectrum disorder (ASD) including the development of the First Years Inventory (FYI), which is a parent-report instrument designed to identify infants who might eventually receive a diagnosis of ASD.

I have played various roles in the research world that have provided me with the wide perspective that I will present in this book. My interest in psychology dates from my years as an undergraduate psychology major at UNC-Chapel Hill, working with Dr. V. M. LoLordo on studies of operant behavior in pigeons. I received an M.A. in General Psychology at Wake Forest University in 1975 studying adult cognition with Dr. Charles Richman. I then entered the Ph.D. program in Psychology at the University of Colorado at Boulder with a primary interest in cognitive topics, initially working with Dr. Lyle Bourne, Jr. Under the influence of my advisor and dear friend Dr. Elizabeth Bates, I became interested in understanding the cognitive development of infants. In 1978, I moved to Harvard University to conduct my dissertation on infant categorization and language with Dr. Jerome Kagan, and I remained at Harvard as Director of the Harvard Infant Study, collaborating with Kagan and other colleagues on studies of behavioral inhibition. I joined the faculty at Yale University in 1987, and renewed my focus on infant cognitive development. Most of my research at Yale was conducted in collaboration with colleagues in the MacArthur Network on Developmental Transitions and with graduate students. I returned to UNC-Chapel Hill Psychology Department in 1998, and I am delighted to have returned to my “home sweet home” with its great cuisine, climate, and culture. My local affiliations include the Center for Developmental Science (CDS), the Frank Porter Graham Child Development Institute (FPG), the Carolina Institute for Developmental Disabilities (CIDD), and the Program for Early Autism Research, Leadership & Service (PEARLS).

I have served in many administrative positions directly relevant to research methodology, and I have also done extensive teaching on this topic. My first course on this topic was an undergraduate course at Yale. The 10 renditions of my graduate course on this topic at UNC-Chapel Hill have evolved into this book. One of the main seeds for the book was my chapter “Research design and methods: Toward a cumulative developmental science” in *The Oxford Handbook of Developmental Psychology* (2013), edited by my first Ph.D. student, Philip D. Zelazo. One additional perspective on research methodology has emerged through my editorial work including leading the development of the Society for Research in Child Development’s (SRCD) recent journal,

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Child Development Perspectives; serving on the editorial boards of *General Psychology Review*, *Developmental Science*, *Infancy*, etc.; and actively listening to talks in a wide array of contexts.

I could add an entire chapter describing and praising the people who have assisted me in various ways and my authorship of this book. Particularly salient at the present moment, I thank the following students for helping me form this important synthesis by reading my chapters and editing them: Rebecca Stephens, Dana Pettygrove, Priscilla San Souci, Kelly Sheppard, Heidi Vuletich, Dana Wood, Erika J. Bagley, Nicholas Wagner, Maura Sabatos-DeVito, and Jen Gibson. Recent editors of the book include Grace Baranek, Barbara Goldman, Phil Zelazo, and Jed Elison.

The course that I taught on this topic (Psychology 216 then 762) definitely evolved, and in its final rendition was described as addressing a broad array of perspectives on research on human development with the goal of facilitating the pursuit of an optimal cumulative developmental science. Our weekly discussions were based on specific readings and any other articles that students discovered and read if they wanted additional perspectives on the topic for that week. Students were asked to email me a one-page ~400-word reaction paper (not a summary paper) prior to class each week. The goal of the reaction paper was to encourage students to read the relevant material, ponder the topic, and to formulate questions and observations that would fuel our discussions. Grades in this class were based on reaction papers, class participation, and a take-home final exam. The primary criteria for success in each aspect of this course were active and appropriate participation, conceptual depth, and creative synthesis.

The final exam evolved and eventually became my effort to motivate my students to review the topics that we covered and to consolidate a set of ideas that students would find useful during their career. Here is the specific assignment:

We have addressed a broad array of perspectives on research on human development with the goal of facilitating the pursuit of an optimal cumulative developmental science. I hope that our discussions have helped you develop many ideas that will help you with your subsequent research and with your evaluation of research conducted by others. For the final exam, please review the articles that you have read for this course, your reaction papers, your notes, and your brain, and use this information to formulate a document that describes the top 10 insights/guidelines/commandments that will improve your developmental science research methodology and/or that will improve the quality of research in developmental science more broadly and that you will use when you are engaged in activities like reviewing articles or grants, or handing out tenure, awards or other evaluations. The balance between items that are relevant for your research versus items that are more generally relevant will probably depend upon how far you have advanced in your own research, so either type of item is fine.

To facilitate the document's gradability for me and long-term functionality for you, please state each idea in specific headings numbered 1–10 and then use approximately 1 page (using the ~400-word per page format you used in your reaction papers) to articulate the idea, how you expect to use it (with specific examples if possible), and why the idea is important to you as an individual scientist and/or as a member of the larger research community. You can mention the idea's history or the articles that support it, but I am much more interested in your description of how you expect to use the idea and why you see it as important. Some of your items might be quite narrow and specific, and others might be broad. Some ideas might be direct quotes from articles and that's fine, but I will be even more impressed if you include some original ideas that you have synthesized across sources and/or the broader expanse of topics we have covered (or that we should have covered).

Please view this document as a resource to help you remember some strategies for pursuing an optimal cumulative developmental science. I'll save it and if I hear that you have won an Early Career Award or that you have been elected president of SRCD, APA, or another professional organization, I will send you a copy and ask you if it helped.

To facilitate student participation in class, I began each class by asking students to answer an interesting question that would help us learn more about our fellow participants. Here is the most recent list of questions that I used:

1. What magazines do you read on a regular basis?
2. Best concert you ever attended?
3. Where would you shop for 2 hours?
4. Favorite local restaurant?
5. Where did you grow up and who were your siblings?
6. Best vacation site and most amazing natural wonder?
7. In the world you grew up in, what were your religion, SES, and region?
8. What instrument do you play or would you like to play?
9. Your background in statistics?
10. What sports are you good at and/or enjoy playing?
11. Most useful website you found recently?
12. Thanksgiving plans?

Class begins now: