

Charles Brainerd

Web Bio

Information

Biography

Biographical Statement

My research and teaching are interwoven so that the two activities reinforce each other and so that, to the greatest extent possible, the latest research findings are integrated into the courses I teach. Throughout my career, my research and teaching have revolved around a single broad theme: the scientific study of human cognition. I have concentrated most extensively on the development of cognitive processes in normal and atypical children, but I have also published considerable research on adult cognition and have taught widely in that area. Thus, my vitae is sprinkled with publications in outlets such as *Journal of Experimental Psychology* and *Journal of Memory and Language*, as well as the familiar developmental outlets, such as *Child Development*, *Developmental Psychology*, and *Journal of Experimental Child Psychology*. In recent years, my research and teaching have also encompassed questions about how cognitive processes are affected by normal aging and by the diseases of late adulthood. This, in turn, has stimulated a research program in cognitive neuroscience. Across all of these areas, a particular focus has been the relationship between memory processes and higher reasoning abilities. After several years of research and teaching on the memory/reasoning interface, I began to develop, with the collaboration of my colleague V. F. Reyna, a general model of how memory influences reasoning and how reasoning influences memory, which is known as fuzzy-trace theory. Fuzzy-trace theory, which seeks to explain some of the most counterintuitive aspects of memory and reasoning, is now widely used by investigators in fields such as forensic psychology, judgment and decision making, and human memory. The theory has become standard fare in undergraduate and graduate courses and can be found in freshman psychology textbooks.

Professional

Current Professional Activities

Dr. Brainerd holds B.S., M.A., and Ph.D. degrees in experimental and developmental psychology. He has published over 200 research articles and chapters, and he has also published over 20 books. His research covers areas such as human memory and decision-making, statistics and mathematical modeling, cognitive neuroscience, learning, intelligence, cognitive development, learning disability and child abuse. Dr. Brainerd's current research program centers on the relation between memory and higher reasoning abilities in children and adults, and it also focuses on false-memory phenomena, cognitive neuroscience, and aging. Together with another Cornell Professor, Valerie Reyna, he is the

co-developer of fuzzy-trace theory, a model of the relation between memory and higher reasoning that has been widely applied within medicine and law.

Dr. Brainerd is a Fellow of the Division of General Psychology, the Division of Experimental Psychology, the Division of Developmental Psychology and the Division of Educational Psychology of the American Psychological Association, and he is a Fellow of the American Psychological Society. Dr. Brainerd has received the Governor of Arizona's Spirit of Excellence Award for scholarly work in higher education and the Trial Defense Services Medal of the Judge Advocate General of the United States Army. Dr. Brainerd advises civilian and military courts on memory research and has contributed to amicus briefs in many appeal cases, including death penalty appeals.

Dr. Brainerd is past Associate Editor of *Child Development*, the leading research journal in developmental psychology, and he is past Associate Editor of *The Behavioral and Brain Sciences*, a prominent theoretical journal in cognitive neuroscience. He is currently editor of *Developmental Review*, the leading journal of theory and literature review in developmental psychology. Dr. Brainerd has received three decades of research support from private foundations and from government agencies such as the National Institutes of Health, the National Science Foundation, the Natural Sciences and Engineering Research Council, the North Atlantic Treaty Organization, and the Department of Agriculture.

Research

Current Research Activities

All of my research and teaching have been characterized by commitments to (a) rigorous research that relies on the experimental method, (b) the application of mathematical models, and (c) the development of predictive theories of cognition. Concerning (a), when it comes to the gain in reliable knowledge that can be derived from research, the experimental method is without parallel. Although important information can be gained from descriptive correlational investigations, especially in the early stages of research, only carefully-counterbalanced studies that are conducted under controlled conditions are able to separate the factors that influence cognition from each other and to establish the cause-effect relations that are essential to theoretical interpretation. For that reason, virtually all of my research has been characterized by hypothesis-driven experimental designs. Concerning (b), a standard conundrum in research on cognitive functions is that the procedures that are used to measure human cognition, from the simplest attentional task to the most complex reasoning task, are not process-pure. That is, performance on such tasks is invariably due to a mixture of contributing cognitive processes. Therefore, by definition, the respective contributions of those processes cannot be separated, let alone quantified, using task performance as the sole source of dependent variables. To accomplish separation and quantification, it is necessary to implement the target processes in a mathematical model that is defined over the task in question and to estimate the model's parameters from performance. Because it is the parameters that carry information about the target processes, data analysis then centers on estimated values of those parameters, rather than on task performance. This, in turn, allows theoretical hypotheses to be directly evaluated, rather than indirectly evaluated under weak measurement assumptions. An additional strength of model-based research that redounds to the benefit of knowledge gain is that theoretical ideas must be sharpened to a

fine edge before they can be embedded in mathematical models. In light of all these advantages, there is no cognitive task that I have studied extensively for which I have not also developed relevant mathematical models. A few examples include Markov models of recognition and recall, Markov models of logical and scientific reasoning, multinomial models of mathematical reasoning, and multinomial models of false recognition and recall. I am now coupling mathematical models with neuroscience methods to achieve process separation at the level of brain activity. Last, concerning (c), one of the abiding limitations of cognitive theories is that they emphasize explanation at the expense of prediction. That is, what counts as an acceptable theory is a body of assumptions that can cover available research findings, hopefully with due regard to parsimony, with little consideration being given to whether new and surprising results fall out of those same assumptions as predictions. However, explaining data is the easy part, and experience has shown that it is possible to formulate multiple competing explanations of any set of data. The more formidable part of theorizing is developing a set of assumptions that will also predict novel findings that would not have been envisioned without those assumptions. That is the type of theorizing that I have stressed in my research and teaching, and fuzzy-trace theory is a prime example. In addition, it is the emphasis on predictive theorizing that is responsible for the fact that my experimental work has so often been concerned with counterintuitive findings--for instance, the cognitive triage effect, the false persistence effect, the mere-testing effect, the memory-independence effect, the memory-interference effect, and the phantom recollection effect.

Extension

Current Extension Activities

Videocasts of the Law, Psychology, and Human Development program's distinguished speakers series are posted on the Extension website. Videocast of several of my lectures in Social and Psychological Aspects of the Death Penalty are posted on the Extension website. Videocasts of several of my lectures in Memory and the Law are posted on the Extension website. I successfully worked with Extension to develop an on-line version of my course Memory and the Law.

Education

Courses

Courses Taught

During 2011

HD 3190
HD 4010
HD 4020
HD 4990
HD 6190

Websites

Related Websites

[Memory and Neuroscience Lab](#)

[HD PhD Development Psychology - Law, Psychology, and Human Development concentration](#)

[Dual PhD/JD Degree Program](#)

[Law, Psychology and Human Development Resources - Outreach & Extension](#)

[Law, Psychology and Human Development - Video Presentations](#)

Administration

Administrative Responsibilities

Member, Graduate Review Committee

Director, PhD Concentration in Law, Psychology, and Human Development

Chair, Department of Human Development

Publications

Selected Publications

Brainerd, C. J., Reyna, V. F., Holliday, R. E., & Nakamura, K. (in press). Overdistribution in source memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition*.

Brainerd, C.J., Aydin, C., & Reyna, V.F. (2012). Development of dual-retrieval processes in recall: Learning, forgetting, and reminiscence. *Journal of Memory and Language*. Advance online publication. doi:10.1016/j.jml.2011.12.002

Brainerd, C. J., Reyna, V. F., & Zember, E. (2011). Theoretical and forensic implications of developmental studies of the DRM illusion. *Memory & Cognition*, 39, 365-380. doi:10.3758/s13421-010-0043-2

Holliday, R. E., Brainerd, C. J., & Reyna, V. F. (2011). Developmental Reversals in False Memory: Now you see them, now you don't! *Developmental Psychology*, 47(2), 442-449. doi:10.1037/a0021058

Brainerd, C. J., Holliday, R. E., Reyna, V. F., Yang, Y., & Togliani, M. P. (2010). Developmental reversals in false memory: Effects of emotional valence and arousal. *Journal of Experimental Child Psychology*, 107, 137-154. doi:10.1016/j.jecp.2010.04.013

Brainerd, C. J., & Reyna, V. F. (2010). Recollective and nonrecollective recall. *Journal of Memory and Language*, 63, 425-445. doi:10.1016/j.jml.2010.05.002

Brainerd, C. J., & Reyna, V. F., & Aydin, C. (2010). Remembering in contradictory minds: Disjunction fallacies in episodic memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 36, 711-735. doi:10.1037/a0018995

Marche, T. A., Brainerd, C. J., & Reyna, V. F. (2010). Distinguishing true from false memories in forensic contexts: Can phenomenology tell us what is real? *Applied Cognitive Psychology*, 24, 1168-1182. doi:10.1002/acp.1629

