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### Author

Washburn, David A.

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## **Duane M. Rumbaugh (1929-2017), Comparative Psychologist: Introduction to the Special Issue**

**David A. Washburn**

*Department of Psychology, Language Research Center, Neuroscience Institute  
Georgia State University, U. S. A.*

This special issue is dedicated to Dr. Duane Rumbaugh. Leaving a lasting legacy in the field of comparative psychology, Dr. Rumbaugh helped to pave the way for cognitive and behavioral research with primates. This special issue is comprised of a set of papers that both commemorate and illuminate his contributions. Written by former students and colleagues, this collection of papers highlights his substantial influence on the development of primatology.

*Keywords:* primate, Duane Rumbaugh

To paraphrase William Shakespeare: Some people are born to be comparative psychologists; others have comparative psychology thrust upon them. For Duane Rumbaugh, both could be said to be true. His interests in experimental psychology and animals began on the farms of Iowa, leading to undergraduate education at Dubuque University (from which he earned his degree) and the State University of Iowa. Entering the discipline at a time when the influence of Clark Hull and Kenneth Spence was pervasive, Rumbaugh the graduate student studied rats' learning of mazes, mentored by former Spence students both for his Master's degree and his Ph.D. This interest in animal learning did not take the form of comparative psychology, however, until Rumbaugh's first postdoctoral academic appointment, a one-year teaching assignment at San Diego State College that was subsequently made a permanent faculty position. Rumbaugh often recounted the story of meeting with his department head to be informed of his teaching responsibilities as a new faculty member. Offered the opportunity to be the regular instructor for the department's comparative psychology course, which had fallen into neglect, Rumbaugh jumped at the chance. As much by assignment as by choice, Duane Rumbaugh began his journey in the study of behavior *across* animal species.

As discussed by Pate and Pate (this issue), Rumbaugh's research interests also became increasingly comparative, as he availed himself of the animals at the nearby San Diego Zoo. Initially he focused his studies on the rodent colony that was bred and maintained by the zoo as food for reptiles and other animals, but he soon expanded his testing to include the many nonrodent species that were available. Another assignment—this a 1958 military stint in the Navy Medical Service Corps, stationed at the Naval Research Institute in Bethesda, MD—would further shape Rumbaugh as a comparative psychologist. Working on a predecessor project to manned spaceflight, Rumbaugh trained and tested squirrel monkeys. When the project ended, Rumbaugh returned to his faculty position in San Diego with a new research focus on nonhuman primates.

In the ensuing 60 years, Duane Rumbaugh made immeasurable contributions to comparative psychology. He published over 200 articles, chapters and books on the subject, reporting the results of studies that were continuously funded by federal grants for four decades. These publications changed much of what

we know about primate learning, language and communication, numerical cognition, and intelligence. He made many methodological innovations for the study of animal (principally, primate) competencies. For example, the procedure he developed for the comparative study of animal intelligence is reviewed by Whitham and collaborators (this issue). That article also highlights Rumbaugh's development of a computer-task testing procedure that is now common in animal-cognition research. The article by Watzek and co-authors (this issue) describes one novel application of that paradigm, in which game-like computer tasks are used to study primate cognition. Perdue and collaborators (this issue) celebrate this contribution as well, illustrating how computerized testing can be used to reveal how salience affects learning and other competencies. The notion of salience was one key to Rumbaugh's theoretical contribution of *emergents* as a third category of behavior, distinguished from respondents and operants, reflecting relational rather than associative learning. Rumbaugh is probably best known, however, for the innovative ape-language research that he and his colleagues undertook. Contributions to the special issue by Heimbauer and collaborators (this issue) and by Savage-Rumbaugh and co-authors (this issue) reflect this area of scholarly interest.

Duane Rumbaugh also contributed extensively to comparative psychology as a leader and ambassador for the field and for the animals that we study. He gave hundreds of talks, served in leadership roles in our societies and for our journals, advocated on behalf of animals and animal science, and mentored many students and colleagues in the field. Maple and Perdue (this issue) consider some of the broader influence of Rumbaugh's research and theory, including their reach beyond comparative psychology. Philosopher John Bickle (this issue) evaluates Rumbaugh's framework even more broadly, drawing parallels between comparative psychology and the growing field of experimental neurobiology.

In the months following Duane Rumbaugh's death, memorial symposia were organized in his honor at the 2018 meetings of the Southeastern Psychological Association (Charleston, SC), the Southern Society for Philosophy and Psychology (San Antonio, TX), and the American Psychological Association (San Francisco, CA). The contributors to those symposia were invited to submit papers for this special issue. Also invited were the current and previous recipients of the Duane M. Rumbaugh Fellowship, established in 2002 by Mr. Steve Woodruff and awarded annually by the Department of Psychology at Georgia State University. These papers reflect scholarship on questions that fascinated Duane Rumbaugh throughout his career, and serve as a testament to the passion that he had for comparative psychology—a field for which he was chosen, and for which he was a champion.

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