

STATE OF NEW YORK  
SUPREME COURT COUNTY OF FULTON

In the Matter of a Proceeding under Article 70 of  
the CPLR for a Writ of Habeas Corpus,

THE NONHUMAN RIGHTS PROJECT, INC.,  
on behalf of TOMMY,

Petitioners,

v.

PATRICK C. LAVERY, individually and as an  
officer of Circle L Trailer Sales, Inc., DIANE  
LAVERY, and CIRCLE L TRAILER SALES,  
INC.,

Respondents.

**AFFIDAVIT OF  
EMILY SUE SAVAGE-  
RUMBAUGH**

Index No.:

STATE OF IOWA )  
 ) ss:  
COUNTY OF Polk )

Emily Sue Savage-Rumbaugh, being duly sworn, deposes and says:

**Introduction and Qualifications**

1. My name is Emily Sue Savage-Rumbaugh. I received a B.A. in Psychology from Southwest Missouri University in 1970, a M.S. in Psychology from University of Oklahoma in 1975, and a Ph.D. in Psychology from the University of Oklahoma in 1975. I have been awarded honorary Ph.Ds by the University of Chicago in 1997, and Missouri State University in 2008. I work and reside in Des Moines, Iowa.

2. I submit this affidavit in support of Petitioners The Nonhuman Rights Project, Inc. ("NhRP"), on behalf of Tommy, for a writ of habeas corpus. I am a non-party to this proceeding.

3. I am currently the Director Emeritus of the Iowa Primate Learning Sanctuary. I previously served as (in reverse chronological order): (1) an Affiliate Professor at Iowa State University, Simpson college for seven years; (2) a Professor, an Associate, and an Adjunct Professor in the Department of Biology & Psychology at Georgia State University over the course of 25 years; and (3) an Associate Research Professor, Assistant Research Professor, and Research Associate at the Yerkes Primate Research Center at Emory University over a 12 year period. I have regularly taught classes in primate behavior, evolution of innate behaviors, evolution of learned behavior, learning theory, developmental psychology, biology, psycho-biology of language, socio-biology, and introductory ethology.

4. During my career I have received 16 awards from a variety of academic, research, nongovernment, media, and professional organizations. Some of the more notable include: (1) one of the most 100 influential scientists in the world by *Time Magazine* in 2010; (2) selection by the Millennium Project for inclusion on the 100 most influential works in cognitive science in the 20<sup>th</sup> century for my book titled, "Language comprehension in ape and child," (1993, Monographs of the Society for Research in Child Development); (3) a Fellow at the American Psychological Association; and (4) a Woodrow Wilson Fellow (1970-1975).

5. I am affiliated with a number of professional organizations including: (1) the International Primatological Society; (2) the American Psychological Association; and (3) the American Psychological Association. During the course of my career, I have also received numerous research grants including grants from: (1) National Institute of Child Health and Human Development; (2) Biomedical Research Support Grant, Emory University; (3) World Wildlife Fund; and (4) The Templeton Foundation.

6. My research specialization is in the study of the language learning and cognition of chimpanzees and bonobos. I began studying the cognitive processes and linguistic behavior in captive chimpanzees in 1971. From 1972 to 1975, I conducted captive studies of mother-infant groups of chimpanzees. From 1975 to 1976, I studied the social behavioral of *Pan paniscus* and *Pan troglodytes*. Following that, I spent 13 years (between 1976-1989) conducting studies of symbolic and cognitive processes in *Pan paniscus*, *Pan troglodytes*, and ailinguistic *Homo sapiens*. In 1993, I spent a year studying free-ranging bonobos. From 1989 until present, I have studied the lexical and vocal linguistic ability, musical ability, tool manufacturing ability and general cognitive development of apes, with a specific focus on bonobos.

7. I have written or co-authored seven books, the most relevant include: (1) *Ape Language: From Conditioned Response to Symbol* (1986, New York: Columbia University Press); (2) *Kanzi: A Most Improbable Ape* (1993, NHK Publishing Co: Tokyo, JAPAN); (3) *Kanzi: The Ape at the Brink of the Human Mind* (1994, New York: John Wiley Publishers); (4) *Apes, Language, and the Human Mind* (1998, New York, NY: Oxford University Press); and (5) *Kanzi's Primal Language: The cultural initiation of apes into language* (2005, London: Palgrave/Macmillan). I have also appeared in five films on chimpanzees and apes, three NHK network (Japan) specials and one BBC special.

8. I have published 181 articles on the learning capability, behaviour, ecology, welfare, or conservation of chimpanzees, monkeys, and baboons. These articles are published in many of the in the world's most-cited peer-reviewed scientific journals, including: *Science*, *American Journal of Primatology*, *Folia Primatologica* (the official journal of the European Federation for Primatology), *International Journal of Primatology*, *Journal of Comparative Psychology*, *Journal of Human Evolution*, *Behavioral and Brain Sciences*, and *Journal of*

*Experimental Psychology, Journal of Biology and Philosophy.* I have also published in *Proceedings of the Fifth International Congress of Primatology, Proceedings of the Sixth International Congress of Primatology, Contemporary Primatology, Encyclopedia Americana, Collier's Encyclopaedia, Encyclopaedia Britannica Yearbook, The Cambridge encyclopaedia of human evolution* and *Encyclopaedia of Neuroscience.* Specific topics of these publications include: the use of symbolization and language by chimpanzees, group formation among captive mother-infant chimpanzees, human-oriented courtship behavior in a human-reared chimpanzee, mothering behavior towards a kitten by a chimpanzee, play and socio-sexual behaviour in chimpanzees, chimpanzee communication, chimpanzee tool use, chimpanzee cognition, chimpanzees and protolanguage, primate intelligence, chimpanzee counting, communicative intentionality in the chimpanzee, the relationship between language in apes and human beings, summation in the chimpanzee, care of captive chimpanzees, imitation by an ape, grammatical development by an ape, the invention of protogrammar by an ape, imitative learning in chimpanzees, delay of gratification in chimpanzees, spontaneous logicomathematical constructions by chimpanzees, primate geometry, and ape consciousness.

9. I regularly give invited lectures and take part in international symposia on primatology, which I have done since 1978. In the United States, I have given lectures at Columbia University, Emory University, Princeton University and the University of Chicago, among many other notable educational institutions. I have also given lectures and presentations on primates in other countries including: England, Japan, Canada, Germany, Australia, Portugal, France, Mexico, Sweden and Berlin. My Curriculum Vitae fully sets forth my educational background and experience and is annexed hereto as "Exhibit A".

### **Basis for Opinions**

10. The opinions I state in this affidavit are based on my professional knowledge, education, training, research and field work, as well as my review of peer-reviewed literature. A full reference list of peer-reviewed literature cited herein is annexed hereto as “Exhibit B”. In addition, the opinions set forth herein are based on many years of collaboration and research with my colleague, Duane Rumbaugh. Professor Rumbaugh and I have designed and implemented research experiments together in a joint laboratory and have co-authored numerous peer-reviewed articles.

### **Opinions**

11. Chimpanzees share about 99% of our DNA (Wildman and Goodman 2002; Wildman, Grossman, and Goodman, 2003; The Chimpanzee Sequencing and Analysis Consortium 2005). This exceptionally high degree of genetic relatedness between chimpanzees and humans cannot, by itself, ensure that chimpanzees possess any specific human abilities. It is however, the single most important piece of scientific evidence to date regarding chimpanzee potential. It indicates that when behavioral studies of chimpanzees suggest that they are capable of self-aware conscious action, the capacity to reason and think, the ability to acquire symbolic language, there is reason to take these results seriously. It also ensures the following:

- a. Chimpanzee brain and behavior, like human brain and behavior, are, flexible and nearly completely dependent upon learning (Norman, 2002).
- b. Social and physical environment during prenatal, post-natal and childhood development plays a critical role in the development of adult cognitive capacities in the chimpanzee (Stern, D. 1971; Stern, D. 1977; Acqarone, 2007).

- c. Early mother/infant behavioral rearing trajectories are the single most important factor in determining manifestation of higher order cognitive capacities and conscious reflective capacity in adult chimpanzees (Trevathan, 1978; Trevathan, 1998; Brakke and Savage-Rumbaugh, 1999). When behavioral studies present differing assessments of chimpanzee cognitive capacities, differing early experience are the most probable cause (Greenfield, Maynard, Boehm, Schmidling, 2000; Greenfield, Lyn, and Savage-Rumbaugh; 2006. Greenfield, Lyn, Savage-Rumbaugh, 2008; Greenfield, 2009).
- d. That chimpanzees, like us, will manifest a developmental program that is designed to allow for the manifestation of increasing levels of consciousness awareness and self-understanding throughout adulthood, through culture and learning (Greenspan, 2004, Rumbaugh, D. M. & Savage-Rumbaugh; 1996). That significant behavioral plasticity present in both humans and chimpanzees means that the “normal” characteristics of any conscious self-aware individual (chimpanzee or human) will not manifest in an identical manner in every member of that species (Kellogg and Kellogg, 1933; Kitcher, 2006; Savage, Temerlin, and Lemmon 1973; Savage, 1975; Savage-Rumbaugh, 1984).
- e. That, under natural conditions, chimpanzees will develop and utilize self-awareness, self-agency and intelligence to survive (Wrangham, 2009; Muller and Wrangham, 2009; Nishida, Zamma, Matsusaka, T., Inaba, McGrew, W.C., 2010, Goodall, 1986).
- f. That chimpanzees, in natural conditions, will come to employ cause-effect reasoning to construct an understanding of their environment (Boesch, 2000,

2009; 2012; Savage-Rumbaugh, 1990; Rumbaugh and Washburn, 2003). They will also construct a social structure that is rule-based, conscious and successful thereby allowing them to survive as group, by virtue of culture, not by natural instinct (Nishida, 1968; 1970, 1979; Sugiyama, 1968, 1969, 1973a,b, 1981; Telekia, 1973; McGrew and Tutin, 1973; Tuttle, 1986; Preutz, 2002). Their DNA provides a neural basis for learning, but very few innate patterns of reaction to specific environmental stimuli (Tutin, 1975)

12. No design differences have been discerned between the structure of chimpanzee and human brains (Passingham, 1982; Passingham and Ettlenger, 1974).

13. Broca's Area and Wernicke's Area are regions in the brain that enable symbolic communications. The areas that correspond to Broca's Area and Wernicke's Area in chimpanzees correspond to those parts of the brain that enable their symbolic communications (Passingham, 1981).

14. In our laboratories, Professor Rumbaugh and I have demonstrated that chimpanzees reared early on in rich social linguistic worlds come to use geometric symbols (i.e. circles, squares, etc) the way we employ printed words (Rumbaugh, Gill, and Von Glasersfeld, 1973, Rumbaugh, 1977; Rumbaugh, 2013; Rumbaugh and Washburn, 2003). These chimpanzees are not reared in impoverished circumstances or social isolation. They have peers as well maternal and paternal familial social attachments. The various geometric symbols serve as words to them, and to the humans communicating with them (Savage-Rumbaugh, 1986; 1994).

15. The more learned amongst them can discuss social situations with each other and with those human researchers if the researchers attend to and understand their nonverbal

linguistic abilities. (Menzel, 1999). For example, they are capable of telling the researchers where they want to go, who they want to be with, the foods they want to eat (see Kanzi.bvu.edu). Those who comprehend spoken English, can communicate even more complex things, as long as the researchers are willing to patiently inquire and listen to their "yes/no" answers. They can answer yes/no questions about their inner most thoughts, plans, feelings, intentions, dislikes and likes if they trust the researcher and believe that this knowledge will not be employed against them (NHK, unpublished footage). They can also answer questions about the likes and dislikes of their companions and will tell researchers what other apes, who cannot comprehend English, want and/or think (Savage-Rumbaugh, 1986; Savage, 1975).

16. Chimpanzees can recognize themselves in mirrors and on television and use a flashlight to examine the interiors of their own throats. (Savage-Rumbaugh, 1986). Panzee, a chimpanzee reared with humans and bonobos, evidenced a sense of self and passed the mirror recognition test at 6 months of age. They demonstrate that they can recognize themselves in photos, videos, and masks ((Menzel, Savage-Rumbaugh, and Lawson, 1985; Savage-Rumbaugh, 1986). As adults they continue to recognize pictures of themselves and others, when they were children (Personal observation, Beran, SavageRumbaugh, Brakke, Kelley, & Rumbaugh, 1988; Beran, Pate, Richardson,& Rumbaugh, 2000). This capacity to "step-outside" the self and reflect upon ones own behavior, as one might reflect on the behavior of another- allows one to become the objects of one's own thought. This capacity is at the root of human cultural, linguistic and moral systems (Savage-Rumbaugh and Hopkins, 19896; Savage-Rumbaugh, and Rumbaugh, 1998). Between the ages of two and three, chimpanzees are capable of deception. (Savage-Rumbaugh and McDonald, 1988). By three, they enjoy hiding games and can hide for as long as several hours without moving, even as researchers pass close by searching for them. By



adulthood, this capacity is translated into long planned stealthy raids on neighboring rival groups (Boesch, 2000, 2012).

17. Chimpanzees have demonstrated that they have intentions. They employ symbols to express themselves (Savage-Rumbaugh, 1986; Kanzi.bvu.edu). They do not simply respond to stimuli nor do they use symbols or signs as tricks to gain rewards. They are able to state what they are going to do, in advance of acting, then carry out their stated action. Thus their statements of intent match their actions. Examples include statements made by two language-trained chimpanzees, Sherman and Austin, who told each other the foods they were intending to share and told experimenters which items they were going to give to them (Savage-Rumbaugh, Shanker, Taylor, 1996).

18. With the emergence of the ability to state their intentions, Sherman and Austin also revealed that not only did they recognize and understand differential knowledge states between themselves, but they that language allows separate beings to bring their different knowledge states into accord with their own imminent intentions and thus to plan co-actions (Savage-Rumbaugh, Shanker and Taylor, 1998). For example, Sherman and Austin began to say 'Go outdoors' and then to head for the door, or 'Apple refrigerator' and then take an apple from the refrigerator (rather than any of the other foods that were located in the refrigerator). These were not requests, but statements of intent. When they reliably told human beings what they were going to do, the humans did not have to wonder where they were headed. This gave them an independence of action and social freedom that can only be developed within a language-based society (Greaves, Bensen, Tagliatela, Thibault, 2005)

19. The chimpanzees Sherman and Austin began (on their own and without training) to use symbolic means to co-ordinate their intended behavior with that of others by explaining

what they were going to do before they did so. In order to be able to produce statements about intended action, for the purpose of co-coordinating future actions with others, one must be able to form a thought and hold it in mind until agreement is reached between two parties. Coordinated actions can then take place between two sentient minds, because both have come to an agreement prior to action.

20. Chimpanzees demonstrate that they have learned symbols for hundreds of items, events and locations. They remember these symbols for decades, and learn new symbols without being taught, but by observing others use them (other apes or humans.) They can master syntax. There is no essential difference between what words chimpanzees learn mean to them, and what words humans learn mean to them.

21. Chimpanzees spontaneously begin comprehending both lexigrams and human speech, and not merely single words, but the specifics of hundreds of novel requests, and the understanding of conditional clauses. For example, the first time Panzee was told that there was a "Gorillas hiding just ahead in the woods" her hair immediately became erect and she began to walk with careful stealthy footsteps while looking cautiously for a gorilla. The first time she was told "If you will share your cereal with Sherman, you can have some more" -- she walked over to Sherman's cage and pushed her box of cereal it toward him. Another example was the understanding of such novel sentences as "If you hold still, I can put your backpack on." Conditional (if/then) relationships make up and very large portion of language use. Once children understand if/then linguistic structures almost anything can be negotiated linguistically, than through physical action.

22. Chimpanzees grasp the elements of language. For example, one day a human named Tim was standing outside the room of Lana, a language-trained chimpanzee, while

drinking a coke. Lana had learned the word for "coke," but had previously employed the word only in the context of obtaining coke from her vending machine, by using the stock sentence "Please machine give coke." She had never used the word "coke" in any other way or in any other sentence. One day there was no coke in her vending machine. She saw Tim standing outside drinking his own coke and she wanted one. She had learned the stock sentences "Tim give Lana this drink," and "Lana move out of room." Suddenly -- with no demonstration -- she formed the novel utterance "Lana drink this out of room?" Elements of all of these different stock phrases were thereby recombined to form the appropriate new sentence "Lana drink this out of room?" in a meaningful novel sentence. In order to test if this was an accident, the following day Tim intentionally repeated the behavior of drinking a coke outside of her room. This time Lana asked, "Please Lana drink coke this room." This was a slightly different utterance, but with a similar meaning and grammatically correct form. It indicated that Lana possessed a linguistic flexibility far beyond any sentences she had been taught and that she recognized many different types of utterances could be used to convey the same message. This is one of hallmarks of language, i.e. there is not one-to-one relationship between utterances and events. Instead there is an infinite array of flexible ways of communicating the same or similar things with just slight changes in meaning. In this case, her second novel utterance made clear WHAT it was that Lana wanted to drink, as Tim had a look on his face that very "official experimenter" oriented. (The previous day he had just been drinking a coke not doing a specific test.) Lana also added the polite function of "Please" -- again showing sensitivity to the difference in Tim's mood which she read from his face and body language.

23. When Sherman and Austin communicated with each other, a variety of spontaneous communicative gestures arose to augment their symbolic communication (Savage-

Rumbaugh, Rumbaugh, and Boysen, 1978). These gestures indicated that they paid close attention to the visual regard of the other. For example, if Austin were looking away when Sherman selected a symbol, Sherman would wait until Austin looked back. He would then point to the symbol he had used. If Austin still hesitated, Sherman would point to the food that the symbol symbolized (Savage-Rumbaugh, 1986; [Kanzi.byu.edu](http://Kanzi.byu.edu)). If Austin's attention wandered even more, Sherman would take Austin's head and turn it toward the keyboard. If Sherman were not attending to Austin's request, Austin would gaze steadfastly at the symbol until Sherman took note. They recognized that the speaker had to monitor the listener, watch what he was doing and make judgments about his state of comprehension. Depending upon these judgments, the speaker had to decide how to proceed with conversational repair.

24. Sherman and Austin also invented an elaborate and highly sophisticated and creative rule-based system for intra-species gaze, symbols, body posture, head movements and gestures ([kanzi.byu.edu](http://kanzi.byu.edu); Savage-Rumbaugh, Rumbaugh, Boysen, 1979).

25. Chimpanzees announce what that they are about to do, where they are going, what assistance they want from others, and how they feel (Savage-Rumbaugh, Ronski, Sevcik and Pate (1983)). They announce what they are going to retrieve from an array of objects that they've seen in another room (Savage-Rumbaugh, Pate, Lawsen, Smith and Rosenblum, 1983). They announce that they have seen important social events such as when they have seen another chimpanzee that has been anesthetized rolled by on a cart (this is extremely upsetting to them), or when they see that a gorilla has attacked another chimpanzee on television (Savage-Rumbaugh, Scanlon and Rumbaugh, 1980; Personal observation).

26. Chimpanzees accomplish "cross-modal perception". This means that they can take in information in one modality such as vision or hearing, and can internally translated to

information in another modality. They can also take in symbolically encoded information and translate it into any non-symbolic mode. For example when shown a picture of an object, they can retrieve that object by touch alone. They can also retrieve the correct object by touch when shown only the symbol representing that object (Savage-Rumbaugh, Hopkins, and Sevcik, 1988).

27. Chimpanzees recount what happened yesterday to an otherwise unknowing listener. For example -- if Panzee saw food hidden in a particular location, she can tell someone who has no idea where it is, how to go the place even though the original hiding was one, two, three, four or five days later (Menzel, 1999). Chimpanzees identify hidden items by name and, at times, state that it is covered with leaves and sticks (Menzel, 1999). Chimpanzees direct a human to a specific spot to retrieve the item through the orchestrated use of their lexigrams, vocalizations, pointing, and affective behaviors, such as facial expression. As the person being directed to a hidden item gets close, Panzee will smile, nod her head, produce breathy panting laughter -- etc. -- all with deliberate intent. Chimpanzees then celebrate when food is retrieved. They do so by giving loud pant hoots, rushing around in circles, hugging each other, and walking upright -- much like people act just after their team wins a close football game. (Personal observation). They also celebrate when they anticipate that they are, at last, successfully solving a computer task (by giving high pitched screams followed by pant hoots, hugging the experimenter and sometimes slapping themselves in joy) (Personal Observation).

28. Chimpanzees almost instantaneously distinguish relative masses and amounts (Rumbaugh, Savage-Rumbaugh, and Hegel, 1987; Rumbaugh, Savage-Rumbaugh, and Pate, 1988).

29. Chimpanzees have been taught the principle of number lines, cardinality and numerosity. They have counted as high as 21. (Unpublished data, Savage-Rumbaugh; Rumbaugh 2003; Rumbaugh, Hopkins, Washburn, and Savage-Rumbaugh, 1989).

30. Chimpanzees engage in mediational learning (Meador, Rumbaugh, Pate, Bard, 1978). They are able to “figure out” rules that allow them to solve new problems -- based on past information which they collate over multiple trials and reflect upon. This requires an ability to compute relationships among a variety of things and events. They understand they are positing predictive or cause-and-effect relationships about tasks they work on, and that they have control over what they do and what will happen (Rumbaugh, 1971; Rumbaugh and McCormack, 1969; Savage-Rumbaugh, 1990).

31. Chimpanzees use their imagination to engage in pretend-aggression and other forms of pretend. Sherman delighted in pretending that a King Kong doll was biting his fingers and toes. He would startle his caretakers by pretending to be in pain as he poked a needle in his skin and out the other side, being careful to just pierce the out layer of skin which was rather thick and which perhaps was not very painful. It looked awful to his caregivers, and he took great delight in the reactions his teasing provoked in his caretakers. He thought this so much fun that he began to try this trick in other locations around his body to see where he would get the greatest reaction for the caretakers ([Kanzi.bvu.edu](http://Kanzi.bvu.edu), personal observation).

32. Chimpanzees demonstrate, as did Lana in our laboratory, that she had a theory of mind, that she knew she had a mind, that she knew that a human had a mind, and that she knew that her mind and state of knowledge differed from that of the human. She believed that others had minds, thoughts, intentions, feelings, needs, desires, and intentions (Rumbaugh, 1977, in preparation, Rumbaugh 2013). Similarly, Sherman and Austin were presented with the need to

give each other specific information about the nature of 14 hidden foods. Only Sherman knew the contents of the container. It was his job to tell Austin, in whatever way he could, the name of the hidden food. It was Austin's job to translate this information back into geometrical symbols request. They were not shown how to do this, they were merely provided with the means to do so as the food trademarks were left on the floor in Sherman's room. The task required that they recognize that labels such as 'Coca Cola' and that 'M and M' were symbols. That Austin could understand the information Sherman was trying to convey even though neither had employed such trademarks as symbols ever before in their lives. This task was essentially a version of "mind-reading" tasks in which one chimpanzee has knowledge that another does not have. Both Sherman and Austin used these food labels, from the first trial, to tell the other individual the type of food that was hidden in the container. They then were asked to change roles and continued the successful symbolic informational exchange, again without making any errors at all (Savage-Rumbaugh, 1986). The uses that chimpanzee's make of language are very similar to those that humans employ, in that tend to give "new information" and/or to speak about things that are not obvious are given from the context alone. They focus on things that they logically assume the listener will not know. Young children employ language in a similar way. Thus the manner and mode of their language use itself indicates that they have a "theory of mind concept," that is, they believe other individuals have minds with content and that such content often differs. Language is a means to bring content into alignment in a manner that is beneficial to speaker and listener, allowing them to coordinate their behavior (Greenfield and Savage-Rumbaugh, 1984).

33. Chimpanzees are able to use symbols to communicate wishes, desire, needs, abstract information and sometimes secrets to one another. They tell each other what foods





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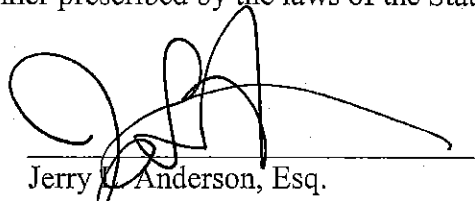
1. This Certificate of Conformity is submitted pursuant to New York CPLR 2309(c)  
and New York Real Property Law § 299-a.

2. I am an attorney duly licensed to practice law in the State of Iowa.

3. I certify that the Affidavit of Emily Sue Savage-Rumbaugh, signed and dated on

Nov. 22, 2013, was taken in the manner prescribed by the laws of the State of Iowa.

Dated: November 22nd, 2013  
Des Moines, Iowa



Jerry C. Anderson, Esq.  
610 E. Salem Ave.  
Indianola, Iowa 50125

# **EXHIBIT A**

## CURRICULUM VITAE

Emily Sue Savage-Rumbaugh

Address: Iowa Primate Learning Sanctuary  
4200 SE 44<sup>th</sup> Avenue  
Des Moines, IA 50320  
(515) 243 – 3580

### Education

B.A. (Cum Laude), Southwest Missouri University: Psychology; May, 1970  
M.S. University of Oklahoma: Psychology; May, 1972  
Ph.D. University of Oklahoma: Psychology; May, 1975  
Faculty Advisor: Dr. W. B. Lemmon

### Current Position

Director Emeritus -- Iowa Primate Learning Sanctuary

### Academic Appointments

2004-2011 Affiliate Professor Iowa State University, Simpson College  
1992-2004 Professor, Dept. of Biology & Psychology, Georgia State University  
1987-92 Assoc. Professor, Dept. of Biology, Georgia State University  
1984-92 Assoc. Research Professor, Yerkes Primate Research Center, Emory  
University  
1983-87 Adjunct Assoc. Professor, Dept. of Biology, Georgia State University  
1977-84 Ass't Research Professor, Yerkes Primate Research Center Emory  
University  
1976-77 Research Assoc., Yerkes Regional Primate Research Center, Emory  
University  
1975-76 Post-Doctoral Fellow, Georgia State University  
1972-75 Graduate Teaching Ass't, Department of Psychology, University of  
Oklahoma

### Areas of Teaching Competency

primate behavior, evolution of innate behaviors, evolution of learned behavior, learning theory, developmental psychology, biology, psycho-biology of language, socio-biology, introductory ethology.

### Research Experience

1970-71 Study of cognitive and verbal learning processes of children  
1971-72 Study of cognitive processes and linguistic behavior in captive *Pan troglodytes*  
1972-75 Captive studies of mother-infant groups of *Pan troglodytes*  
1975-76 Comparative studies of the social behavioral of *Pan paniscus* and *Pan*

- troglodytes*
- 1976-1989 Studies of symbolic and cognitive processes in *Pan paniscus*, *Pan troglodytes*, and alinguistic *Homo sapiens*
- 1989-to now Studies of the lexical and vocal linguistic ability, musical ability, tool manufacturing ability and general cognitive development of apes, with a specific focus on bonobos.
- 1993 Studies of free-ranging bonobos.

### **Awards and Honors**

Bob Green Fellowship, for academic distinction, Southwest Missouri University, 1969-1970.

Woodrow Wilson Fellow, 1970-75.

First Place, Graduate Student Paper Competition, Midwest Psychological Association, Oklahoma City, 1972.

Fellow, Division 6, APA 1985-present

Fellow, Division 1, APA 1985-present

Fellow, APS 1996-present

National Lecturer, Sigma Xi, The Scientific Research Society, July 1, 1988 to June 30, 1990.

Representative for Women in Science, Brigham Young University, 1989

The Smithsonian Institution's display of "Understanding Ourselves, Understanding Each Other," sponsored by the American Psychological Association's Centennial Convention, featured research of the Language Research Center, Georgia State University, to which I made major contributions. A film by the same name of the display is now distributed nationally for educational purposes by the APA, 1992

Nobel Conference XXXII Invited Speaker, "Apes at the End of an Age: Primate Language and Behavior in the 90's", Gustavus Adolphus College, October, 1996.

Honorary Doctor of Science, The University of Chicago, Chicago, Ill., June, 1997.

Author, "Language comprehension in ape and child," published Monographs of the Society for Research in Child Development (1993), selected by the "Millennium Project," a listing of the top 100 most influential works in cognitive science in the 20th century by the University of Minnesota Center for Cognitive Sciences, 1999.

Leighton A. Wilkie Award in Anthropology, Indiana University, November, 2000.

Selected as a Woman of Influence, by Des Moines Business Record, 2007

Honorary Doctor of Science, Missouri State University, 2008.

Selected as one of the most 100 Influential scientists in the world, *Time Magazine*, 2010

### **Committees**

1996-2004 Editorial Board of Language and Communication.

1989 Site visit committee member, National Institute of Child Health and Human Development.

1989-2004 Neurobiology and Behavior Development Committee Department of  
Biology, Georgia State University

**Professional Organizations**

American Psychological Association  
American Psychological Society  
International Primatological Society  
Society for Research and Child Development

## PUBLICATIONS

### Books Authored

Savage-Rumbaugh, E. S. (1986). Ape Language: From Conditioned Response to Symbol. New York: Columbia University Press.

Savage-Rumbaugh, E. S. (1993). Kanzi: A Most Improbable Ape. NHK Publishing Co: Tokyo, JAPAN.

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Savage-Rumbaugh, E.S., Rumbaugh, D.M., & Fields, W.M. (2009) "Empirical Kanzi: The ape language debate revisited." *The Skeptic v 15(1)*.

#### **In Press**

Savage-Rumbaugh, E. S., D. M. Rumbaugh, J. E. King, J. Tagliatella (in press). Foundations of language in a Festschrift volume for Prof. Holloway, Stone Age Institute, Indiana University

Savage-Rumbaugh, E.S., & Fields, W.M. (in press) "Maternal care, self agency, moral agency, epigenetics and culture: Implications for the rise of language in *Homo symbolicus* and *Pan symbolicus*." Volume from the Homo Symbolicus Conference.

Lyn, Greenfield, and Savage-Rumbaugh (in press) Semiotic Combinations in *Pan*: A Comparison of Communication in a Chimpanzee and Two Bonobos. *First Language*

Rumbaugh, D. M., Hillix, A., & Savage-Rumbaugh, E. S. (in press). The emergence of reason, intelligence, and language by humans and animals. *Yale Journal of Criticism*.

## PRESENTATIONS

### **Presentations 1978**

Savage-Rumbaugh, E. S. (1978, Fall). Symbolic communication between chimpanzees. Invited seminar speaker, Swarthmore College, Swarthmore, PA.

Savage-Rumbaugh, E. S. (1978, Fall). Tool-use and symbolic communication in the chimpanzee. Invited seminar speaker, Princeton University, Princeton, NJ.

Savage-Rumbaugh, E. S. (1978, Fall). Symbol acquisition in apes: A discussion of the



paradigms. Invited seminar speaker, Rockefeller University, NY.

### **Presentations 1980**

Savage-Rumbaugh, E. S. (1980, January). The status of chimpanzee language research.

Invited seminar speaker, Kenyon College, Gambier, OH.

Savage-Rumbaugh, E. S. (1980, May). Straight from the horse's mouth. Paper presented at Conference on Clever Hans Phenomenon: Communication with horses, whales, apes, and people, New York Academy of Sciences.

Savage-Rumbaugh, E. S. (1980, November). Ape language research. Invited speaker, Georgia chapter of Sigma Xi.

### **Presentation 1981**

Savage-Rumbaugh, E. S. (1981, February). Emergence of communication skills in two chimpanzees. Invited seminar speaker, Department of Anthropology and the Center for Cognitive Studies, University of Chicago.

Savage-Rumbaugh, E. S. (1981, November). Levels of Communicative symbol use: Prerepresentational and representational. Invited presentation at the T. C. Schneirla Conference on Developmental Genetics and Learning, Wichita, KS.

Savage-Rumbaugh, E. S. (1981, November). Ape language research: Update and clinical implications. Short course presented at the Annual Meeting of the American Speech-Language-Hearing Association, Los Angeles, CA.

### **Presentations 1982**

Savage-Rumbaugh, E. S. (1982, March). Language behaviors of humans and apes -- pigeons, too? Discussant for symposium at the annual meeting, Southeastern Psychological Association, New Orleans, LA.

Savage-Rumbaugh, E. S. (1982, May). Behavioral similarities of chimpanzees and pigeons: Superficial or real? Invited speaker, Meeting of the Association for Behavior Analysis, Milwaukee, WI.

Savage-Rumbaugh, E. S. (1982, June). Acquisition of functional symbol usage in apes and children. Invited speaker, Harry Frank Guggenheim Conference on Animal Cognition, Columbia University, NY.

Romski, M. A., White, R. A., and Savage-Rumbaugh, E. S. (1982, June). Language training using communication boards: some special considerations. Presented at the annual meeting, American Association on Mental Deficiency, Boston, MA.

Savage-Rumbaugh, E. S. and Rumbaugh, D.M. (1982, August). Referential symbol skills of two chimpanzees. Paper presented at the Congress of the International

Primatological Society, Atlanta, GA.

Savage-Rumbaugh, E. S. (1982, November). Primate communication and language. Invited speaker, Symposium on Human Origins, University of Alabama, Birmingham, AL.

### **Presentations 1983**

Pate, J. L. and Savage-Rumbaugh, E. S. (1983, March). Does a chimpanzee know what it is saying? Presented at the annual meeting, Southeastern Psychological Association, Atlanta, GA.

Savage-Rumbaugh, E. S. (1983, May). Verbal behavior in the chimpanzee. Invited address, Association for Behavioral Analysis, Milwaukee, WI.

Savage-Rumbaugh, E. S. (1983, June). Ape language and the issue of intentional communication. Keynote speaker, Annual Meeting of the Animal Behavior Society, Lewisburg, PA.

Savage-Rumbaugh, E. S. (1983, June). Chimpanzee Language Learning: Current Status. Invited presentation at the conference on Dolphin behavior and cognition: Comparative and ecological aspects. Target papers, ONR sponsored conference, Hubbs-Sea World Research Institute, San Diego, CA.

Savage-Rumbaugh, E. S. (1983, August). Language: A continuum from ape to human. Invited paper at the Symposium of the American Psychological Association, Anaheim, CA.

Savage-Rumbaugh, E. S. (1983, September). Ape language from a behavioral perspective. Paper presented at an Invitational Conference on Research Paradigms, coordinated by the National Institute of Child Health and Human Development, Washington, D. C.

Savage-Rumbaugh, E. S. (1983, November). Comparisons of preverbal competency between Pan troglodytes and Pan paniscus. Invited paper presented at Symposium on the pygmy chimpanzee, International Primatological Conference, Atlanta, GA.

Savage-Rumbaugh, E. S. (1983, December). Apes, language, and what their accomplishments have to say to human beings. Keynote Speaker, Women in Science Symposium, Kennesaw College, Kennesaw, GA.

### **Presentations 1984**

Savage-Rumbaugh, E. S. (1984, January). Do apes really talk? Invited speaker, Biological Sciences Symposium, University of Georgia, Athens, GA.

Savage-Rumbaugh, E. S. (1984, May). Contrasts in symbolic communicative competency in Pan troglodytes and Pan paniscus. Invited paper presented at Association of Behavioral Analysis, Nashville, TN.

Savage-Rumbaugh, E. S. (1984, May). Language acquisition in the great apes: And overviews. Paper presented at the Conference for the Integration of the Sciences, Georgia State University, Atlanta, GA.

Savage-Rumbaugh, E. S. (1984, June). The capacity of animals to acquire language -- Do species differences have anything to say to us? Invited paper presented at the Royal Society of England, London.

#### **Presentations 1985**

Savage-Rumbaugh, E. S. (1985, May). Language acquisition and cognition in the chimpanzee. Invited symposium speaker, Rutgers Symposium on Animal Cognition, New Brunswick, NJ.

Savage-Rumbaugh, E. S. (1985, June). Language acquisition in two species of apes. Keynote speaker, Annual Scientific Meeting of the American Society of Primatologists, University of Buffalo, State University of New York, Niagara Falls, NY.

Savage-Rumbaugh, E. S. (1985, August). Language learning without training in the pygmy chimpanzee. Invited symposium speaker, American Psychological Association, Division of Experimental Psychology, Los Angeles, CA.

#### **Presentations 1986**

Savage-Rumbaugh, E. S. (1986, January). Language acquisition and nonverbal behavior in apes. Invited speaker, Emory Anthropology Department, Atlanta, GA.

Savage-Rumbaugh, E. S. (1986, February). The implications of ape language studies for Philosophy and Biology. Invited keynote speaker at the "Can Philosophy Help Biology... and vice versa" conference, University of Georgia, Athens GA.

Savage-Rumbaugh, E. S. (1986, March). Language learning and English comprehension in the pygmy chimpanzee. Invited speaker, Behavioral Biology Seminar Series, Rockefeller University, NY.

Savage-Rumbaugh, E. S. (1986, March). The pygmy chimpanzee learns to use and comprehend symbols without training. Invited speaker, Class of 1902 Lecture Series, Bryn Mawr, NY.

Savage-Rumbaugh, E. S. (1986, June). Comprehension of spoken English and synthesized speech in a pygmy chimpanzee (Pan paniscus). Presented at the eighth annual meeting, American Society of Primatologists, Austin, TX.

Brakke, K. E., Savage-Rumbaugh, E. S., McDonald, K., & Hopkins, W. D. (1986, June). A comparative analysis of symbol acquisition in two pygmy chimpanzees (Pan paniscus). Paper presented at the Eighth Annual Meeting, American Society of

Primatologists, Austin, TX.

Hopkins, W. D., & Savage-Rumbaugh, E. S. (1986, June). Vocal communication in the pygmy chimpanzee (*Pan paniscus*) as a result of differential rearing experiences. Paper presented at the Eighth Annual Meeting, American Society of Primatologists, Austin, TX.

Rumbaugh, D. M., & Savage-Rumbaugh, E. S. (1986, June). Summation in the chimpanzee. Paper presented at the Eighth Annual Meeting, American Society of Primatologists, Austin, TX.

Sevcik, R. A., Savage-Rumbaugh, E. S., & McDonald, K. (1986, June). Video experience and symbol acquisition in a pygmy chimpanzee (*Pan paniscus*). Paper presented at the Eighth Annual Meeting of the American Society of Primatologists, Austin, TX.

Greenfield, P. M. and Savage-Rumbaugh, E. S. (1986, July). Imitation is not rote: Pragmatics of repetition in child and chimpanzee. Presented at the XIth Congress of the International Primatological Society, Gottingen, West Germany.

Savage-Rumbaugh, E. S., Romski, M. A., Hopkins, W. D., & Sevcik, R. A. (1986, November). Species differences in language acquisition and use. Invited presentation at the Chicago Academy of Science Conference, "Understanding Chimpanzees," Chicago, IL.

#### **Presentations 1987**

Savage-Rumbaugh, E. S. (1987, March). A new look at ape language: Comprehension of vocal speech and syntax. Invited speaker at the 35th Annual Nebraska Symposium on Motivation, "Comparative Perspectives in Modern Psychology," University of Nebraska, Lincoln, NE.

Savage-Rumbaugh, E. S. (1987, April). Contrasts in symbol acquisition between pygmy chimpanzees. Invited speaker, Biennial Meeting of the Society for Research in Child Development, Baltimore, MD.

Hopkins, W. D., Rumbaugh, D. M., Savage-Rumbaugh, E. S. and Washburn, D. A. (1987, June). Learning strategies in the acquisition of counting behavior in a chimpanzee. Presented at the annual meeting of the American Society of Primatologists, Madison, WI.

Sevcik, R. A., Romski, M. A., & Savage-Rumbaugh, E. S. (1987, November). Role of comprehension in symbol acquisition: Evidence from special populations. Mini-seminar presented for the Meeting of the American Speech-Language-Hearing Association, New Orleans, LA.

#### **Presentations 1988**

Savage-Rumbaugh, E. S. (1988, March). Where language studies of apes have come from, where they are now, and where they are going. Invited speaker, History and Philosophy of Science Series, Franklin and Marshall College, Lancaster, PA.

Rumbaugh, D. M., & Savage-Rumbaugh, E. S. (1988, April). Counting and protoarithmetic competencies of chimpanzees (Pan troglodytes). Paper presented at the Eightieth Annual Meeting of the Southern Society for Philosophy and Psychology, Miami, FL.

Savage-Rumbaugh, E. S. (1988, April). Some of our best friends are chimps. Invited speaker, DeKalb GSU Alumni Program, Atlanta, GA.

Savage-Rumbaugh, E. S. (1988, May). Language comprehension is key to referential language production in chimps and retarded children. Invited speaker, Animal Language and Communication Series, San Diego State University, San Diego, CA.

Savage-Rumbaugh, E. S., & Rumbaugh, D. M. (1988, June). Language skills of chimpanzees and bonobos. Invited speakers, National Institute of Child Health and Development Conference, Bethesda, MD.

Savage-Rumbaugh, E. S. (1988, August). Speech comprehension with semantic content by the bonobo. Paper presented at the Annual meeting of the American Psychological Association, Atlanta, GA.

Sevcik, R. A., Savage-Rumbaugh, E. S., Ronski, M. A. (1988, August). Symbolic communication by apes and humans: A longitudinal comparative perspective. Poster session presented at the Annual meeting of the American Psychological Association, Atlanta, GA.

Savage-Rumbaugh, E. S. (1988, October). Invited Speaker, Psychological Sciences Program Seminar, Georgia State University, Atlanta, GA.

Savage-Rumbaugh, E. S. (1988, November). Methods of measuring language comprehension in apes. Invited Speaker, Emory program in cognition and development, Emory University, Atlanta, GA.

Savage-Rumbaugh, E. S. (1988, November). Why apes talk and what they have to say. Invited Speaker, Concordia University, Montreal, Canada.

#### **Presentations, 1989**

Savage-Rumbaugh, E. S. (1989, April). Language: Our erroneous but cherished preconceptions. Invited lecture at the Animal Language Workshop, University of Hawaii at Manoa.

Savage-Rumbaugh, E. S. (1989, February). Language learning: A capacity unique to

Homo sapiens? Invited lecture, Georgia State University Department of Anthropology, Atlanta, GA.

Savage-Rumbaugh, E. S. (1989, April). Invited seminar on Psychobiology of Animal Cognition, Columbia University, New York.

Savage-Rumbaugh, E. S., Brakke, K. E., Sevcik, R. A. (1989, June 10-11). Comparative language acquisition in apes. Poster presented at the First annual meeting of the American Psychological Society, Alexandria, VA.

Bolser Gilmore, L., Savage-Rumbaugh, S. (1989, June 15-17). Reproductive and delivery behavior of a bonobo (Pan paniscus). Poster and videotape presented at the Fertility in Great Apes Conference, Atlanta, GA.

Brakke, K., Savage-Rumbaugh, E. S. (1989, August 10-12). Speech Comprehension in Infant Bonobo (Pan paniscus) and Chimpanzee (Pan troglodytes). Paper presented at the fifth annual meeting of the Language Origins Society, University of Texas, Austin, TX.

Savage-Rumbaugh, E. S. (1989, September). Site visit committee member, National Institute of Child Health and Human Development.

Savage-Rumbaugh, E. S. (1989, October). Invited lecture, Oglethorpe University, Atlanta, Georgia.

Savage-Rumbaugh, E. S. and Rumbaugh, D. (1990, March 16-24). The invention of language. Invited paper presented at the Wenner-Gren Foundation for Anthropological Research, Cascais, Portugal.

#### **Presentations, 1990**

Brakke, K. E. & Savage-Rumbaugh, E. S. (1990, March 29-31). Comparative motor and manipulatory development: Behavior growth in infant human and apes. Poster presented at the 11th Biennial Conference on Human Development hosted within the Southeastern Region of the United States, Richmond VA.

Rumbaugh, D. M., Washburn, D. A., Savage-Rumbaugh, E. S. & Hopkins, W. D. (1990, March 29-April 1). The Language Research Center's Computerized Test System (LRC-CTS): Video-formatted tasks for primates. Paper presented at the Eighty-Second Annual Meeting of the Southern Society for Philosophy and Psychology.

Savage-Rumbaugh, E. S., (1990, April 17). Ape Minds: What are they in the Chimpanzee, Dialogue Series. Institute for Disabilities Studies, University of Minneapolis, Minneapolis, MN.

Savage-Rumbaugh, S., Ronski, M.A., Rumbaugh, D. (1990, April 18-21). Comprehension versus Production: How is Language Learned? Invited paper

presented at the 23rd Annual Gatlinburg Conference on Research and Theory in Mental Retardation and Developmental Disabilities, Brainerd, MN.

- Savage-Rumbaugh, E. S. (1990, May 16). Language learning: A capacity unique to Homo sapiens? Department of Anthropology, California State University, Sacramento CA.
- Savage-Rumbaugh, E. S. (1990, June 8). Syntactical comprehension in the bonobo. Paper presented in symposium, Chimpanzees: Language, speech, comprehension, counting, and video tasks, Second annual convention of the American Psychological Society, Dallas, TX.
- Savage-Rumbaugh, E. S. (1990, June 14). Apes and us: What happens when we begin to communicate with each other? Lecture to Yerkes Regional Primate Research Center Faculty and Staff.
- Savage-Rumbaugh, E. S., & Rumbaugh, D. M. (1990, July 20). Language acquisition and use in the bonobo. Videotape presentation presented at the thirteenth Congress of the International Primatological Society, Nagoya, Japan.
- Rumbaugh, D. M., Washburn, D. A., Savage-Rumbaugh, E. S., Hopkins, W. D. & Richardson, W. (1990, July 21). The Language Research Center's Computerized Test System (LRC-CTS): Video-formatted tasks for primates. Paper presented at the thirteenth Congress of the International Primatological Society, Nagoya, Japan.
- Savage-Rumbaugh, E.S. (1990, July 22). Ape Language Research: Past, present and future, Guest speaker, Thirteenth Congress of the International Primatological Society, Satellite symposium at Kuruma-michi Campus, Aichi University, Nagoya, Japan.
- Savage-Rumbaugh, E. S. (1990, July 23). Cognitive, linguistic, and postural developmental contrasts between female co-reared Pan troglodytes and Pan paniscus. Presented in symposium, "Behavior of our closest relatives, chimpanzees and bonobos", at the Thirteenth Congress of the International Primatological Society, Kyoto, Japan.
- Savage-Rumbaugh, E. S. (1990, July 24). Implications of the cognitive and linguistic abilities of the bonobo for theories of the development of hominid culture. Presented in symposium, "Hominid Culture in primate perspective" at the thirteenth Congress of the International Primatological Society, Kyoto, Japan.

#### **Presentations 1991**

- Rumbaugh, D. M., & Savage-Rumbaugh, E. S. (1991, April 11-14). Chimpanzees track normal child language. In T. Verhave (Chair), "Higher-order classes and language: Data from humans and nonhumans." Symposium conducted at the

Eastern Psychological Association, NY.

Sevcik, R. A., Savage-Rumbaugh, E. S., & Hirsh-Pasek, K. (1991, April). Overextensions in a pygmy chimpanzee are referential and not associative in nature. Paper presented at the Biennial Meeting of the Society for Research in Child Development, Seattle, WA.

Savage-Rumbaugh, E. S. (1991, May 1-4). Language and cognition innate. Invited presentation at the 24th Annual Gatlinburg Conference on Research and Theory in Mental Retardation and Developmental Disabilities, Key Biscayne, FL.

### **Presentations 1992**

Williams, S. L., & Savage-Rumbaugh, E. S. (1992, April). English comprehension in Pan paniscus. Presented at the Eastern Psychological Association meeting, Boston, MA.

Williams, S. L., & Savage-Rumbaugh, E. S. (1992, August). Differential rearing and effects on acquisition of language and other cognitive abilities. Presented at the XIVth Congress of the International Primatological Society, Strasbourg, France.

Savage-Rumbaugh, E. S. (1992, August). Chimpanzee and humans -- The language link. G. Stanley Hall Lecturer at the American Psychological Association, Washington, DC.

### **Presentations 1993**

Savage-Rumbaugh, S. (1993, February). What does my cousin think? Language capacity in the great apes. Invited presentation presented at the annual meeting of AAAS Meeting, Boston, MA.

Chung, J. C., Bowman, B. A., Savage-Rumbaugh, E. S., & Williams, S. (1993, March). Nutrient intakes of bonobos chimpanzees (Pan paniscus). Fed of American Society of Exp. Biology Journal: 7(3), A294. Poster presented in New Orleans, LA. (abstract).

Savage-Rumbaugh, S. (1993, March). The critical components of language acquisition in apes and humans. In S. Savage-Rumbaugh (Chair), "Language processes in apes and humans: Facilitation and assessment." Presented at the 26th Annual Gatlinburg Conference on Research and Theory in Mental Retardation and Development Disabilities, Gatlinburg, TN..

Savage-Rumbaugh, S. (1993, April). Working with apes who get it. Invited presentation at the Annual Series "Lectures on Mental Retardation and Human Development", Kennedy Center, Nashville, TN.

Savage-Rumbaugh, S. (1993, April). Language and animal mind. Film presented at The Mental Lives of Animals Conference sponsored by The Department of



Philosophy and The Language Research Center, Georgia State University,  
Atlanta, GA.

Rumbaugh, D. M., & Savage-Rumbaugh, S. (1993, May). Language skills of chimpanzees. Presented at the Annual Chimpanzee Conference, Green Oakes Inn, Fort Worth, TX.

#### **Presentations 1994**

Savage-Rumbaugh, E. S., & Rumbaugh, D. M. (1994, March). Primate intelligence. Panel discussion, Biology Department Seminar Series, Morehouse College, Atlanta, Ga.

Savage-Rumbaugh, E. S. (1994, May). Concepts of competency. A presentation within Creating Culture Apes & Humans: A Forum for Discussion. Sponsored by Georgia State University and Emory University, Atlanta, GA

Savage-Rumbaugh, E. S. (1994, October). Lecturer at Kyoto University Primate Research Center, Inuyama, JAPAN.

Savage-Rumbaugh, E. S. (1994, October). Lecturer at Meiji-Gakuin University (Yokohama), Tokyo, JAPAN.

Savage-Rumbaugh, E. S., & Rumbaugh, D. M. (1994, October). The intelligence of animals. Invited presentation at the Nagoya Port Aquarium, Nagoya, JAPAN.

Savage-Rumbaugh, E. S., Williams, S., Furuichi, T., & Kano, T. (1994, November). Language realized: Symbolic communication of Pan paniscus. Invited paper at The Great Apes Revisited Conference, Wenner-Gren Foundation for Anthropological Research, Mexico.

#### **Presentations 1995**

Savage-Rumbaugh, E. S. (1995, March). The Eighth CSEOL Symposium. Invited presentation: Communication with Chimpanzees. UCLA Center for the Study of Evolution and the Origin of Life.

Savage-Rumbaugh, E. S. (1995, April). Guest Lecturer: Toward a Science of Consciousness conference. Hosted by University of Arizona, Tucson.

#### **Presentations 1996**

Savage-Rumbaugh, E. S. (April, 1996). Keynote Address Why have we assumed that animals do not have language? Conference on The Minds of Nonhuman Animals, University of Colorado at Boulder.

Beran, M. J., Rumbaugh, D. M., & Savage-Rumbaugh, E. S. (August, 1996). Performance of a chimpanzee (Pan troglodytes) on a computerized counting task. Poster Session at the XVIth Congress of the International Primatological Society,

University of Wisconsin, Madison, WI.

Savage-Rumbaugh, E. S. & Rumbaugh, D. M. (1996, August). Primate intelligence and language: Brain and Environment. Symposium at the XVIth Congress of the International Primatological Society and the XIXth Conference of the American Society of Primatologists, University of Wisconsin, Madison, WI.

Savage-Rumbaugh, E. S. (1996, October). Invited speaker at the XXXII Nobel Conference. Apes at the end of an age: Primate language and behavior in the 90's. Gustavus Adolphus College.

#### **Presentations 1997**

Savage-Rumbaugh, E. S. (1997, January). Invited speaker, Buckhead Rotary, Atlanta, GA.

Beran, M. J., Rumbaugh, D. M., & Savage-Rumbaugh, E. S. (1997, March). Paper presented at Southern Society for Philosophy and Psychology Annual Meeting. Evaluation of current language comprehension in three chimpanzees (Pan troglodytes): Effect of rearing on duration of language comprehension. Atlanta, GA.

Rice, D. R., Savage-Rumbaugh, E. S., & Rumbaugh, D. M. (1997, March). Session at Southern Society for Philosophy and Psychology Annual Meeting. A chimpanzee's ability to learn ordinality and counting. Atlanta, GA.

Savage-Rumbaugh, E. S. (1997, April). Lecturer, Seminar entitled Exploring the Primate Mind. Primate language: At the brink of the human mind. National Zoological Park, Washington, D.C.

Savage-Rumbaugh, E. S. (1997, May). Sigma Xi Public Talk. Apes, Language, Math, and Minds. University of New Mexico, Albuquerque, NM.

Savage-Rumbaugh, E. S. (1997, December). Discussant. Great Ape Concert. Canberra, Australia.

Savage-Rumbaugh, E. S. (1997, December). Keynote Speaker. Australian Primate Society Annual Meeting. Tasmania, Australia.

Savage-Rumbaugh, E. S. (1997, December). Invited Lecturer. University of New England, Armidale, Australia.

#### **Presentations 1998**

Savage-Rumbaugh, E. S. (1998, February). Invited symposium at American Association for the Advancement of Science Annual Meeting. Darwinian Perspectives on the origin of Language: Bonobo Communication. Philadelphia, PA.

Beran, M. J., Savage-Rumbaugh, E. S., & Brakke, K. E. (1998, April). Paper presented at the 2<sup>nd</sup> International Conference on the Evolution of Language. Language comprehension in three chimpanzees (Pan troglodytes): Effect of rearing on level of comprehension.

Savage-Rumbaugh, E. S. & Fields, W. M. (1998, June). Language and culture: A trans-generational interweaving. Invited speaker, Jan Wind Memorial Lecture, Language Origins Society, 14<sup>th</sup> Annual Meeting, Tallahassee, FL.

Savage-Rumbaugh, E. S. (1998, November). Behavior and mental abilities of primates. Invited speaker, Tufts University Center for Animals and Public Policy, Lecture series: "Animal Cognition and Communication", Natick, MA.

### **Presentations 1999**

Savage-Rumbaugh, E. S. & Fields, W. M. (1999, January). The differential emergence of consciousness in infant bonobos as a function of pre- and post-natal environment. Invited speaker, "The Problem of Animal Consciousness: Historical, Theoretical, and Empirical Perspectives", sponsored by the Society of Integrative and Comparative Biology, Denver, CO.

Savage-Rumbaugh, E.S. & Fields, W.M. (1999). Probing the Realities of Ape Language. Invited speaker, "The Evolution of Apes and the Origins of Human Beings," SAGA2/COE Joint International Symposium, Primate Research Institute, Kyoto University, Inuyama, Japan, November.

Savage-Rumbaugh, E. S. (1999, July) Bonobos: Music, Art, Tools, and Speech. Invited speaker, SpoletoScienza conference on "Views on the Mind", Spoleto, Italy.

Savage-Rumbaugh, E. S. (1999, September). Invited speaker, "Consciousness: Integrating Phenomenology and Cognitive Science", sponsored by the Fetzer Institute, Kalamazoo, MI

### **Presentations 2000**

Savage-Rumbaugh, E. S., Rumbaugh, D. M. (2000, March) The apes and us: Language, culture, and other emergent processes. "Crossing Boundaries" Annual Conference of the American Association for Applied Linguistics, Vancouver, Canada.

Savage-Rumbaugh, E. S., Fields, W. M., Tagliatela, J. P. (2000, April). Language, Culture and Tools. Invited speakers, 3<sup>rd</sup> International Conference on "The Evolution of Language", Paris, France.

Savage-Rumbaugh, E. & Fields, W. (2000, July). "A Restatement of the Achievements of Ape Language with a Theory of Mind Update." The XXVII International Congress of Psychology, Stockholm, Sweden.

Savage-Rumbaugh, E. S. (2000, September). Why play? Invited speaker, "The Playful Mind" symposium, Lemelson Center for the Study of Invention and Innovation, Smithsonian National Museum of American History.

#### **Presentations 2001**

Menzel, C. R., Savage-Rumbaugh, E. S., Menzel, E. W. Jr. (2001, January). Primate Geometry. Paper presented at "Primates in the New Millennium", The XVIIIth Congress of the International Primatological Society, Adelaide, South Australia.

Savage-Rumbaugh, E. S. and Taglialatela, J. P. (2001, January). The mind of the bonobo: expectations, explications, and conversations. Paper presented at "Primates in the New Millennium", The XVIIIth Congress of the International Primatological Society, Adelaide, South Australia.

Renard, S. and Savage-Rumbaugh, E. S. (2001, July). Intonation and meanings in bonobo vocalizations. Paper presented at "Interfaces: Systemic Functional Grammar and Critical Discourse Analysis," The 28<sup>th</sup> International Systemic Functional Congress, Ottawa, Canada.

Savage-Rumbaugh, E. S., Spircu, T., & W. Fields (2001, August). Vocal speech in a nonhuman primate. Presented at the XXVII International Ethological Conference, Tübingen, Germany.

#### **Presentations 2002**

Savage-Rumbaugh, E. S. (2002, June). Apes, language and species – Where we've been and where we're going: A Tribute to the critic. Presented at "Zoosemiotics: From Clever Hans to Kanzi in Memory of Tom Sebeok (1920-2001)," Center for Semiotic and Cognitive Studies, Università degli Studi, Repubblica di San Marino.

Savage-Rumbaugh, E.S. (2002, October). Symbols, syntax, paragraphs, and context. Where the subjective confronts the objective. Presented at Emory Cognition Workshop. Symbol Use and Symbolic Representation. Emory University, Decatur, Georgia.

#### **Presentations 2003**

Savage-Rumbaugh, E.S. & Fields, W. (2003, April). The Emergence of Tools Embedded in Culture: Beyond Anthropomorphism. The 39<sup>th</sup> Annual University of Cincinnati Philosophy Colloquium: Perspectives on the Animal Mind.

Fields, W. & Savage-Rumbaugh, S. (2003, May). Bonobo Beliefs and Desires. Seventh Congress of the Association of the Scientific Study of Consciousness. Memphis, Tennessee.

Spircu, T. & Savage-Rumbaugh, E.S. (2003, June). Analyzing bonobo vocalization by using computer: results and limitations. University of Bielefeld, Center for

Interdisciplinary research, Seminary on General Theory of Information Transfer and Combinatorics.

Savage-Rumbaugh, E.S. (2003, October). The Development of Forgiveness. Forgiveness Conference, Templeton Foundation, Atlanta, Georgia.

**Presentations 2004 -- Bonobos Relocated to Great Ape Trust**

Savage-Rumbaugh, S. (2004, February). Fifteen Minutes of Apes. The TED Conference, Monterey, California.

**Presentations 2005**

Savage-Rumbaugh, S. (2005, February). Our Closest Living Relatives, the Bonobos: What They Mean to Us and Why. Invited lecturer, "Speaking of Science" series at Buena Vista University, Storm Lake, Iowa.

**Presentations 2006-2008**

Records lost during move of bonobos from the Language Research Center to Great Ape Trust.

**Presentations (2009)**

Maternal care, self agency, moral agency, epigenetics and culture: Implications for the rise of language in *Homo symbolicus* and *Pan symbolicus*. Jan. 16-20, Capetown, South African, *Homo symbolicus: The Dawn of Language, Imagination and Spirituality*. A symposium presented by the John Templeton Foundation.

Language: The Carrier Wave of Culture, Tools and Intelligence, Science Circle, February 2009.

Intentionality in All its Guises, Invited Speaker, Evolutionary Studies Program at Binghamton University. March 20, 2009. Binghamton University

Why the Pan/Homo Culture made Kanzi speak: Culture theory as a supplement to genetic evolution. May, 2009. Berlin Behavioral Biology Symposium, Berlin.

How Culture Makes Bonobos Speak: The Rise of Language, Consciousness and Moral Agency in Bonobos (*Pan symbolicus*). Science Circle, Great Ape Trust, June 29.

***Sigma Xi National Lecturer--1988-1990***

1988 September; Western Maryland College, Westminster, MD.

1988 October; Southwest Missouri State University, Springfield, MO.

1989 February; University of South Florida, Tampa, FL.

- 1989 April; Columbia University, New York
- 1989 May; University of Cincinnati, Cincinnati, OH.
- 1989 May; Rush-Presbyterian-St. Lukes Medical Center, Chicago, IL.
- 1989 August; Vassar College, Poughkeepsie, NY
- 1989 October; Northwestern University, Evanston, IL.
- 1989 November; Hollins College, Roanoke, VA.
- 1989 December; Marshall University, Huntington, West VA.
- 1990 January; Eastern Kentucky University, Lexington, KY.
- 1990 January; Stockton College, Pomona, NJ.
- 1990 February; Hope College, Holland, MI.
- 1990 February; Georgia Tech University & Emory University, Atlanta, GA.
- 1990 February; University of South Dakota, Vermillion, SD and South Dakota State University, Brookings, SD.
- 1990 March; Cornell University, Geneva, NY.

#### RESEARCH GRANTS

- Research Development Grant (1974), University of Oklahoma (\$1,500).
- National Institute of Child Health and Human Development HD06016 (1980-1985).  
Principal Investigator, Animal Model Project (\$100,000).
- National Institute of Child Health and Human Development HD06016 (1985-1999).  
Principal Investigator, Language Acquisition in Pan paniscus (\$2,500,000). Co-  
investigator, Cognitive Project.
- Biomedical Research Support Grant, Emory University (1987-1989). Co-investigator,  
"Hemispheric dominance for language and cognitive processes in the  
chimpanzee" (\$20,000).
- World Wildlife Fund, Grant # HW13, March 1, 1998 - February 28, 2000. Principal  
Investigator, Partial Support of the Congolese Conservation Initiative of the  
Bonobo Protection Fund (\$15,000).
- The Templeton Foundation, Grant (2001-2004) Program Project Coordinator. Studies in  
Forgiveness (\$218,322).
- The Milt Harris Foundation, Grant (2002-2003) Principal Investigator, "Non-Human  
Vocalization Study (Pan paniscus) (\$50,000).

National Institute of Child Health and Human Development HD06016 (1999-2002)  
Program Project Coordinator, Studies of Language, Culture, and Tools  
(\$1,530,689).

National Institute of Child Health and Human Development HD06016 (1999-2002)  
Principal Investigator, The Embedding of Language in Culture (\$338,601).

#### REVIEW ACTIVITIES

1985-present: Board of Editors, Psychological Record

Referee: American Journal of Primatology, American Scientist, Brain and Behavioral Sciences, Journal of Comparative Psychology, National Institute of Health, National Geographic Journal, National Science Foundation, Psychological Record (Board of editors, 1985-pres.), Science, Yale University Press, Center for Field Research

Grant Reviews: National Institute of Health, National Geographic Society, National Science Foundation, Center for the Field Research

# **EXHIBIT B**



## EXHIBIT B

### BIBLIOGRAPHY

- Acquarone, S. 2007. *Signs of Autism in Infants: Recognition and Early Intervention*. Karnac Books.
- Benson, J., Greaves, W., Savage-Rumbaugh, S., Tagliatela, J., & Thibault, P. (2005) "The thin end of the wedge: grammar and discourse in the evolution of language." In J. D. Benson & W. S. Greaves (Eds.) *Functional Dimensions of Ape-Human Discourse*, Equinox Press.
- Beran, M. J., SavageRumbaugh, E. S., Brakke, K. E., Kelley, J. W., & Rumbaugh, D. M. (1998). Symbol comprehension and learning: A "vocabulary" test of three chimpanzees (Pan troglodytes). *Evolution of Communication* 2, 171-188.
- Beran, M. J., Gibson, K. R. , & Rumbaugh, D. M. (1999). Predicting hominid intelligence from brain size. In M. Corbalis & E. G. Lea (Eds.), *The descent of mind: Psychological perspectives on hominid evolution*. New York: Oxford University Press.
- Beran, M. J., Savage-Rumbaugh, E. S., Pate, J. L., & Rumbaugh, D. M. (1999). Delay of gratification in chimpanzees (Pan troglodytes). *Developmental Psychobiology*, 34, 119-127.
- Beran, M. J., Pate, J. L., Richardson, W. K., & Rumbaugh, D. M. (2000). A chimpanzee's (Pan troglodytes) longterm retention of lexigrams. *Animal Learning and Behavior*, 28, 201-207.
- Beran, M. J., & Rumbaugh, D. M. (2001). "Constructive" enumeration by chimpanzees (Pan t roglodytes) on a computerized task. *Animal Cognition*, 4, 81-89.
- Beran, M. J., Washburn, D. A., & Rumbaugh, D. M. (2008). The Stroop Effect in color-naming of color-word lexigrams by a chimpanzee. *Journal of General Psychology*, 134, 217-228.
- Boesch, C and O'Connell, S. (2012) *Chimpanzee: The Making of the Film*, Disney Editions: Network
- Boesch, C. (2009). *The Real Chimpanzee: Sex Strategies in the Forest*. Cambridge Un. Cambridge Un. Press.
- Boesch, C. (2012). *Wild Culture: A Comparision between Chimpanzee and Human Cultures*.
- Cerutti, D. T., & Rumbaugh, D. M. (1993). Stimulus relations in comparative primate perspective. *Psychological Record*, 43, 811-821.
- Chimpanzee Sequencing and Analysis Consortium 2005. Initial sequence of the chimpanzee genome and comparison with the human genome. *Nature* 437.

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- Essock, S. M., Gill, T. V., & Rumbaugh, D. M. (1977). Language relevant object and color naming tasks. In D. M. Rumbaugh (Ed.), *Language Learning by a Chimpanzee: The LANA Project* (pp. 193-206). New York: Academic Press.
- Essock, S. M., & Rumbaugh, D. M. (1978). Development and measurement of cognitive capabilities in captive nonhuman primates. In H. Markowitz & V. J. Stevens (Eds.), *Behavior of Captive Wild Animals* (pp. 161-208). Chicago: NelsonHall.
- Fouts, R.S. & Fouts, D.H. (1993). Chimpanzees' Use of Sign Language. In P. Cavalieri & P. Singer (Eds.), *The Great Ape Project: Equality Beyond Humanity* (pp. 28-41). New York: St. Martin's Press.
- Gallup, G. G. (1987). Self awareness. In J. Erwin (Ed.), *Comparative primate biology: Volume 2B. Behavior, cognition and motivation*, (pp. 3-16). New York: Alan R. Liss.
- Gardner, R.A. & Gardner, B.T. (1969). Teaching Sign Language to a Chimpanzee. *Science*, 165, 664-672.
- Gibson, K. R., Rumbaugh, D. M., & Beran, M. J. (2001). Bigger is better: Primate brain size in relationship to cognition. In D. Falk & K. R. Gibson (Eds.), *Evolutionary anatomy of the primate cerebral cortex* (pp. 79-97). Cambridge: Cambridge University Press.
- Goodall, 1986, *The Chimpanzees of Gombe: Patterns of Behavior* Boston: Bellknap Press of the Harvard University Press.
- Greenfield, P. & Savage-Rumbaugh, E. S. (1991). Imitation, grammatical development, and the invention of protogrammar by an ape. In Krasnegor, N. A.,
- Greenfield, P. M., Maynard, Boehm, C and Schmidting (2000) Cultural Apprenticeship and Cultural Change: Tool Learning and Imitation in Chimpanzees and Humans. In: *Biology, Brains and Behavior*, (S. T. Parker, J. L. a. M. L. M., ed.). pp. 237-277. School of American Research, Santa Fe.
- Greenfield, P. M., Lyn, H., and Savage-Rumbaugh, E. S. 2006. The development of representational play in chimpanzees and bonobos: Evolutionary implications, pretense and the role of interspecies communication. *Cognitive Development* 21: 199-213.
- Greenfield, P. M., Lyn, H., and Savage-Rumbaugh, E. S. 2008. Protolanguage in ontogeny and phylogeny: Combining deixis and representation. *Interaction Studies: Social Behavior and Communication in Biological and Artificial Systems*. Special Issue: Holophrasis vs compositionality in the emergence of protolanguage 9: 34-35.

- Greenfield, P. M. 2009. Linking social change and developmental change: Shifting pathways of human development. *Developmental Psychology* 452: 401-418.
- Greenfield, P. M. a. L., H. (2007) Symbol Combination in Pan: Language, Action and Culture. In: *Primate Perspectives on Behavior and Cognition*, (Washburn, D., ed.). pp. American Psychological Association, Washington, D. C.
- Greenfield, P. M. and Savage-Rumbaugh., E. S. 1984. Perceived variability and symbol use: A common language-cognition interface interface in children and chimpanzees. *Journal of Comparative Psychology* 98: 201-218.
- Greenspan, S. I. a. S., S. G. 2004. *The First Idea: How Symbols, Language and Intelligence Evolved from our Primate Ancestors to Modern Humans*. De Capo Press, Cambridge MA.
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- Hillix, W. A., King, J. E., & Rumbaugh, D. M. (2012). Comparative psychology. Robert W. Rieber (Ed.), *Encyclopedia of the History of Psychological Theories*. New York: Springer Science+Business Media, LL 10.1007/9-0463-8\_11; t71n18-26114886.
- Hopkins, W. D., Washburn, D. A., & Rumbaugh, D. M. (1990). Processing of form stimuli presented unilaterally in humans, chimpanzees, (Pan troglodytes), and monkeys (Macaca mulatta). *Behavioral Neuroscience*, 104, 577-584.
- Hopkins, W. D., Morris, R. D., Savage-Rumbaugh, E. S., & Rumbaugh, D. M. (1992). Hemispheric priming by meaningful and nonmeaningful symbols in language-trained chimpanzees (Pan troglodytes): Further evidence of a left hemisphere advantage. *Behavioral Neuroscience*, 106(3): 575-58.
- Kellogg, W. N. a. K., L. A. 1933. *The Ape and the Child: A Study of Environmental Influence upon Early Behavior*. McGraw-Hill, New York.
- Kitcher, P. (2006) Two normative roles of consciousness. In: *The Missing Link in Cognition*, (Terrace, H. S. a. M., J., ed.). pp. 174-187. Oxford University Press, Oxford.
- King, J. E., Rumbaugh, D. M. & Savage-Rumbaugh, E. S. (1998). Evolution of intelligence, language, and other emergent processes for consciousness: A comparative perspective. In S. J. Hameroff, A. W. Kaszniak, & A. C. Scott (Eds.) *Toward a science of consciousness II: The second Tucson discussions and debates* (pp. 383-395). Cambridge: MIT Press.
- King, J. E., Rumbaugh, D. M., & Savage-Rumbaugh, E. S. (1999). Perception of personality traits and semantic learning in evolving hominids. In M. Corbalis & E. G. Lea (Eds.),

*The descent of mind: Psychological perspectives on hominid evolution.* (pp. 98-115).  
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