

VITA

RICKYE S. HEFFNER

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Current Principal Job Title

Professor and Associate Chair, Department of Psychology, University of Toledo, Toledo, OH 43606
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Education

B.A., Vanderbilt University, Cum Laude with High Honors in Psychology, 1968
M.S., Florida State University, Psychology, 1970
Ph.D., Florida State University, Psychology, 1973

Honors, Memberships and Affiliations

Member, American Association for the Advancement of Science
Member, American Association of Anatomists
Fellow, American Psychological Association, Division 6
Fellow, American Psychological Society
Member, Society for Neuroscience
Member, American Society of Mammalogists
Member, Animal Behavior Society
Member, Association for Research in Otolaryngology
Honors, Phi Beta Kappa
Distinguished Graduate Award, Neuroscience Program, Florida State University, Awarded 1983

Fields of Present Major Scientific Interest

Comparative Hearing (evolution of sound localization, its relation to vision and to the auditory brainstem); influence of other senses on the development of hearing

Related Training and Professional Experience

University Fellow of Florida State University, 1968-69
Teaching Assistant, Florida State University, 1969-71
Teaching Faculty at Florida A & M University, 1970
Research Assistant, University of Birmingham, England, School of Medicine, Department of Anatomy, 1972
Research Assistant, Johns Hopkins School of Hygiene, Department of Environmental Medicine, 1972-73
Research Associate, Bureau of Child Research, University of Kansas, 1973-78
Courtesy Faculty, Department of Speech and Hearing, University of Kansas, 1975-1987
Assistant Scientist, Bureau of Child Research, University of Kansas, 1978-1982
Associate Scientist, Bureau of Child Research, University of Kansas, 1982-1987
Associate in Mammalogy, Museum of Natural History, University of Kansas, 1984-1987
Associate Professor, Department of Psychology, University of Toledo, 1987-1992

Professor, Department of Psychology, University of Toledo, 1992-present
 Associate Chair, Department of Psychology, Univ. of Toledo, 1993 - present
 Adjunct Faculty, Neurosciences and Neurological Disorders, University of Toledo Health Sciences
 Campus, current.

Grants Awarded (Extramural):

NSF Grant, BNS 78-07391, "Hearing in large mammals." Co-Principal Investigator (with H. Heffner). May 1978-October, 1980.

NIH Research Grant R01 NS12992, "Behavioral analysis of the role of auditory cortex." Co-Investigator (H. Heffner, Principal Investigator), \$505,646 while at University of Toledo.
 Awarded 1978-1981
 Renewed 1981-1985
 Renewed 1985-1990
 Renewed 1992-1996

Deafness Research Foundation, "Hearing in Reptiles." Co-Principal Investigator with H. Heffner. January, 1981-December, 1982.

NIH Research Grant R01 NS17850, "Comparative study of sound localization in mammals" Principal Investigator, \$716,352 while at University of Toledo.
 Awarded 1982-1985
 Renewed 1985-1988
 Renewed September, 1988-August, 1994

NIH Research Grant R01 DC/NS02960 "Evolution of sensory systems in bats" Principal Investigator. April 1996 - May 2002, \$653,123 while at University of Toledo.

Binational Research Foundation (Co-PI with Henry Heffner at UT, Zvi Wollberg, University of Tel Aviv) Cross-modal sensory integration in neonatally blind hamsters (Aug 1996 - July 1999), \$43,500.

NIH Research Grant R01-DC02960-02S1 (R. Heffner, PI) Research supplement to promote the recruitment of *individuals with disabilities* into biomedical research, (\$14,627 June 1997-June 1998)

National Institutes of Health (R. Heffner, PI) Research supplement to promote the recruitment of *minorities* into biomedical research, (\$11,097, Sept 1997-June 1998)

NIH R21 DC006629, "Developing techniques for studying tinnitus in animals." Co-Investigator (H. Heffner, Principal Investigator). December 1, 2005 - November 30, 2007. \$396,000.

NIH R15 DC009321 "Hearing in Bats." \$216,000. Rickye Heffner, Principal Investigator. Sept. 1, 2008 – Aug 31, 2011. Goal is to test hearing and sound localization in a very specialized bat to place it in the context of the evolution of mammalian hearing (and clear up some doubtful published information)

Grant Application Under Review:

Grants Awarded (Intramural):

Mental Health and Retardation Services of the State of Kansas, Categorization of Auditory Stimuli by Retarded Children, Principal Investigator, July 1973-June 1974.

Mental Health and Retardation Services of the State of Kansas, An Investigation of the Use of Brain Tomograms to Supplement Behavior Assessments in Retarded Persons, Principal Investigator, July 1978-July 1980.

University of Kansas Biomedical Sciences Support Grant, The Central Auditory System in Ungulates. Principal Investigator, July 1981-June 1982.

University of Toledo, Ohio Board of Regents Research Challenge Program, "Auditory Brainstem Response Audiometry." Co-Principal Investigator (with H. Heffner). December, 1987-November, 1988.

Reviewer:

National Institutes of Health, Biopsychology Study Section, June, October, 1988

National Institute of Mental Health, Psychobiology and Behavioral Neuroscience Study Section, June 1993 to October 1997, occasional ad hoc reviews

National Institutes of Health, Hearing Study Section, occasional ad hoc reviews

National Science Foundation, ad hoc reviewer

Behavioral Neuroscience

Biochemical Systematics and Ecology

Hearing Research

International Journal of Comparative Psychology

International Journal of Primatology

Journal of Mammalogy

Journal of Comparative Psychology, associate editor 1993-1998, continue to review

Journal of the American Veterinary Medical Association

Journal of Comparative Physiology

Journal of the Association for research in Otolaryngology

Pearson Allyn and Bacon (textbooks)

Sage Publications (textbooks)

Committee Memberships:

University: Institutional Animal Care and Use Committee, Univ. of Toledo, 1987-90, 1998-present; Search Committee for Animal Care Director, Univ. of Toledo, 1988

College: Arts & Science Committee on Undergraduate Advising, Univ. of Toledo, 1989; Dean's Ad Hoc Grievance Committee, Univ. of Toledo, 1990; Arts & Science Colloquium Committee 1992; Biology Dept. Program Review, 1993

Department: Director, Honors Program in Psychology, Univ. of Toledo, 1989-present; oversee undergraduate advising office,

1994-present; various other temporary committees and rotating memberships including Five Year Planning Committee, Executive Committee, Search Committees, Faculty Evaluations and Promotions, Undergraduate Awards.

Journal Articles:

Heffner, R., Heffner, H., & Masterton, B. (1971). Behavioral measurements of absolute and frequency-difference thresholds in guinea pigs. *Journal of the Acoustical Society of America*, 49, 1888-1895.

Heffner, R., & Masterton, B. (1975). Variation in form of the pyramidal tract and its relationship to digital dexterity. *Brain, Behavior and Evolution*, 12, 161-200.

Heffner, R. (1977). Developmental auditory agnosia in retarded adolescents: A preliminary investigation. *Brain and Language*, 4, 521-536.

- Annau, Z., Heffner, R., & Koob, G. F. (1978). Electrical self-stimulation of single and multiple loci: Long term observations. *Physiology and Behavior*, 13, 281-290.
- Heffner, H., & Heffner, R. (1980). Research into Elephant Hearing. *American Association of Zoological Parks and Aquariums Regional Workshop Proceedings*, 23-29.
- Heffner, R., & Heffner, H. (1980). Hearing in the elephant (*Elephas maximus*). *Science*, 208, 518-520.
- Butler, S. R., Glass, A., & Heffner, R. (1981). Asymmetries of the contingent negative variation (CNV) and its after positive wave (APW) related to differential hemispheric involvement in verbal and nonverbal tasks. *Biological Psychology*, 13, 157-171.
- Heffner, H., & Heffner, R. (1981). Functional interaural distance and high-frequency hearing in the elephant. *Journal of the Acoustical Society of America*, 70, 1794-1795.
- Heffner, R., Heffner, H., & Stichman, N. (1982). Role of the elephant pinna in hearing. *Animal Behaviour*, 30, 628-630.
- Heffner, R., & Heffner, H. (1982). Hearing in the elephant: Absolute thresholds, frequency discrimination, and sound localization. *Journal of Comparative and Physiological Psychology*, 96, 926-944.
- Heffner, R., & Heffner, H. (1983). Hearing in large mammals: The horse (*Equus caballus*) and cattle (*Bos taurus*). *Behavioral Neuroscience*, 97, 299-309.
- Heffner, R., & Heffner, H. (1983). Effect of cattle ear mite (*Raillietia auris*) infestation on hearing in a cow. *Journal of the American Veterinary Medical Association*, 182, 612-614.
- Heffner, R., & Heffner, H. (1983). Occurrence of the cattle ear mite (*Raillietia auris*) in Southeastern Kansas. *The Cornell Veterinarian*, 73, 193-199.
- Heffner, H., & Heffner, R. (1983). The hearing ability of horses. *Equine Practice*, 5, 27-32.
- Heffner, R., & Masterton, B. (1983). The role of the corticospinal tract in the evolution of human digital dexterity. *Brain, Behavior and Evolution*, 23, 165-183.
- Heffner, H., & Heffner, R. (1984). Sound localization in large mammals: Localization of complex sounds by horses. *Behavioral Neuroscience*, 98, 541-555.
- Heffner, H., & Heffner, R. (1984). Effect of temporal lobe lesions on the perception of species-specific vocalizations by Japanese macaques (*Macaca fuscata*). *Science*, 226, 75-76.
- Heffner, R. S., & Heffner, H. E. (1984). Hearing loss in dogs after lesions of the brachium of the inferior colliculus and medial geniculate. *Journal of Comparative Neurology*, 230, 207-217.
- Heffner, H. E., & Heffner, R. S. (1985). Hearing in two cricetid rodents: Wood rat (*Neotoma floridana*) and grasshopper mouse (*Onychomys leucogaster*). *Journal of Comparative Psychology*, 99, 275-288.
- Heffner, R. S., & Heffner, H. E. (1985). Hearing in mammals: The least weasel. *Journal of Mammalogy*, 66, 745-755.
- Heffner, R. S., & Heffner, H. E. (1985). Hearing range of the domestic cat. *Hearing Research*, 19, 85-88.
- Heffner, H. E., & Heffner, R. S. (1985). Sound localization in wild Norway rats (*Rattus norvegicus*). *Hearing Research*, 19, 151-155.
- Heffner, H. E. & Heffner, R. S. (1986). Hearing loss in Japanese macaques following bilateral auditory cortex lesions. *Journal of Neurophysiology*, 55, 256-271.
- Heffner, R. S., & Heffner, H. E. (1986). Localization of tones by horses: Use of binaural cues and the role of the superior olivary complex. *Behavioral Neuroscience*, 100, 93-103, 137.

- Heffner, H. E. & Heffner, R. S. (1986) Effect of unilateral and bilateral auditory cortex lesions on the discrimination of vocalizations by Japanese macaques. *Journal of Neurophysiology*, 56, 683-701.
- Heffner, R. S. & Heffner, H. E. (1987). Localization of noise, use of binaural cues, and a description of the superior olivary complex in the smallest carnivore, the least weasel (*Mustela nivalis*). *Behavioral Neuroscience*, 101, 701-708, 744-745.
- Heffner, R. S. & Heffner, H. E. (1988). Sound localization in a predatory rodent, the northern grasshopper mouse (*Onychomys leucogaster*). *Journal of Comparative Psychology*, 102, 66-71.
- Heffner, R. S. & Heffner, H. E. (1988). Sound localization and use of binaural cues by the gerbil (*Meriones unguiculatus*). *Behavioral Neuroscience*, 102, 422-428.
- Heffner, R. S. & Heffner, H. E. (1988). Sound localization acuity in the cat: Effect of azimuth, signal duration, and test procedure. *Hearing Research*, 36, 221-232.
- Heffner, H. E. & Heffner, R. S. (1989). Effect of restricted lesions on absolute thresholds and aphasia-like deficits in Japanese macaques. *Behavioral Neuroscience*, 103, 158-169.
- Heffner, H. E. & Heffner, R. S. (1989). Cortical deafness cannot account for the inability of Japanese macaques to discriminate species-specific vocalizations. *Brain and Language*, 36, 275-285.
- Heffner, R. S. & Heffner, H. E. (1989). Sound localization, use of binaural cues, and the superior olivary complex in pigs. *Brain, Behavior & Evolution*, 33, 248-258.
- Heffner, H. E. & Heffner, R. S. (1989). Unilateral auditory cortex ablation in macaques results in a contralateral hearing loss. *Journal of Neurophysiology*, 62, 789-801.
- Heffner, H. E. & Heffner, R. S. (1990). Effect of bilateral auditory cortex lesions on absolute thresholds in Japanese macaques. *Journal of Neurophysiology*, 64, 191-205.
- Heffner, R. S. & Heffner, H. E. (1990). Vestigial hearing in a fossorial mammal, the pocket gopher, (*Geomys bursarius*). *Hearing Research*, 46, 239-252.
- Heffner, H. E. & Heffner, R. S. (1990). Effect of bilateral auditory cortex lesions on sound localization in Japanese macaques. *Journal of Neurophysiology*, 64, 915-931.
- Heffner, R. S. & Heffner, H. E. (1990). Hearing in domestic pig (*Sus scrofa*) and goat (*Capra hircus*). *Hearing Research*, 48, 231-240.
- Thompson, M., Porter, B., O'Bryan, J., Heffner, H. E., & Heffner, R. S. (1990). A syringe-pump food-paste dispenser. *Behavior Research Methods, Instruments, & Computers*, 22, 449-450.
- Heffner, R. S. & Heffner, H. E. (1991). Behavioral hearing range of the chinchilla. *Hearing Research*, 52, 13-16.
- Hood, L. J., Berlin, C. I., Heffner, R. S., Morehouse, C. R., Smith, E. G., and Barlow, E. K., (1991). Objective auditory threshold estimation using sine wave derived responses. *Hearing Research*, 55, 109-116.
- Heffner, R. S. & Heffner, H. E. (1992). Hearing in large mammals: Sound-localization acuity in cattle (*Bos taurus*) and goats (*Capra hircus*). *Journal of Comparative Psychology*, 106, 107-113.
- Heffner, R. S. & Heffner, H. E. (1992). Visual factors in sound localization in mammals. *Journal of Comparative Neurology*, 317, 219-232.
- Heffner, R. S. & Heffner, H. E. (1992) Hearing and sound localization in blind mole rats, *Spalax ehrenbergi*. *Hearing Research*, 62, 206-216.
- Heffner, R.S. & Heffner, H.E. (1993) Degenerate hearing and sound localization in naked mole rats (*Heterocephalus glaber*), with an overview of central auditory structures. *Journal of Comparative Neurology*, 331, 418-433.
- Heffner, H.E., Heffner, R.S., Contos, C., and Ott, T. (1994) Audiogram of the hooded Norway rat. *Hearing Research*, 73, 244-248.

- Heffner, R.S., Heffner, H.E., Contos, C., and Kearns, D. (1994) Hearing in prairie dogs: Transition between surface and subterranean rodents. *Hearing Research*, 73, 185-189.
- Heffner, R.S., Heffner, H.E., Kearns, D., Vogel, J., and Koay, G. (1994) Sound localization in chinchillas, I: Left/right discriminations. *Hearing Research*, 80, 247-257.
- Heffner, R.S., Heffner, H.E., and Koay, G. (1995) Sound localization in chinchillas, II: Front/back and vertical localization. *Hearing Research*, 88, 190-198.
- Heffner, R.S., Koay, G., and Heffner, H.E. (1996) Sound localization in chinchillas, III: Effect of pinna removal on sound localization. *Hearing Research*, 99, 13-21.
- Jackson, L., Heffner, H.E., and Heffner, R.S. (1997) Audiogram of the fox squirrel, (*Sciurus niger*). *Journal of Comparative Psychology*, 111, 100-104.
- Koay, G., Heffner, H.E., and Heffner, R.S. (1997) Audiogram of the Big Brown Bat (*Eptesicus fuscus*). *Hearing Research*, 105, 202-210.
- Heffner, R.S. (1997) Comparative study of sound localization in mammals and its anatomical correlates. *Acta Otolaryngologica, Supplement* 532, 46-53.
- Koay, G., Kearns, D., Heffner, H.E., and Heffner, R.S. (1998) Passive sound localization ability of the big brown bat (*Eptesicus fuscus*). *Hearing Research*, 119, 37-48.
- Koay, G., Heffner, R.S., and Heffner, H.E. (1998) Hearing in a megachiropteran fruit bat, *Rousettus aegyptiacus*. *Journal of Comparative Psychology*, 112, 371-382.
- Heffner, R.S., Koay, G., and Heffner, H.E. (1999) Sound localization in an Old-World fruit bat (*Rousettus aegyptiacus*): Acuity, use of binaural cues, and relationship to vision. *Journal of Comparative Psychology*, 113, 297-306.
- Jackson, L.L., Heffner, R.S., and Heffner, H.E. (1999) Free-field audiogram of the Japanese macaque (*Macaca fuscata*). *Journal of the Acoustical Society of America*, 106, 3017-3023.
- Heffner, R.S., Koay, G., and Heffner, H.E. (2001) Sound localization in a New-World fruit bat, *Artibeus jamaicensis*: Acuity, use of binaural cues, and its relationship to vision. *Journal of the Acoustical Society of America*, 109, 412-421.
- Harrington, I.A., Heffner, R.S., and Heffner, H.E. (2001) An investigation of sensory deficits underlying the aphasia-like behaviour of macaques with auditory cortex lesions. *Neuroreport*, 12, 1217-1221.
- Heffner, R.S., Koay, G. and Heffner, H.E. (2001) Audiograms of five species of rodents: Implications for the evolution of hearing and the encoding of pitch. *Hearing Research*, 157, 138-152.
- Izraeli, R., Koay, G., Lamish, M., Heicklen-Klein, A.J., Heffner, H.E., Heffner, R.S., and Wollberg, Z. (2002) Cross-modal neuroplasticity in neonatally enucleated hamsters: Structure, electrophysiology, and behavior. *European Journal of Neuroscience*, 15, 1-22.
- Koay, G., Heffner, R.S., and Heffner, H.E. (2002) Behavioral audiograms of homozygous medJ mutant mice with sodium channel deficiency and their unaffected littermates. *Hearing Research*, 171, 111-118.
- Koay, G., Bitter, K.S., Heffner, H.E., and Heffner, R.S. (2002) Hearing in American leaf-nosed bats. I: *Phyllostomus hastatus*. *Hearing Research*, 171, 96-102.
- Koay, G., Heffner, R.S., Bitter, K.S., and Heffner, H.E. (2003) Hearing in American leaf-nosed bats. II: *Carollia perspicillata*. *Hearing Research*, 178, 27-34.
- Heffner, R.S., Koay, G., and Heffner, H.E. (2003) Hearing in American leaf-nosed bats. III: *Artibeus jamaicensis*. *Hearing Research*, 184, 113-122.
- Heffner, R.S. (2004) Primate hearing from a mammalian perspective. *The Anatomical Record*, 281A, 1111-1122.

- Heffner, H.E. and Heffner, R.S. (2004) Response to J. Guo and Y. Chen. *Hearing Research*, 198 146-147.
- Heffner, H.E., Koay, G., and Heffner, R.S. (2005) The sound-localization ability of cats. *Journal of Neurophysiology*, 94, 3653.
- Heffner, R.S., Koay, G., and Heffner, H.E. (2006) Hearing in large (*Eidolon helvum*) and small (*Cynopterus brachyotis*) non-echolocating fruit bats. *Hearing Research*, 221, 17-25.
- Heffner, H. E. and Heffner, R. S. (2007). Hearing ranges of laboratory animals. *Journal of the American Association for Laboratory Animal Science*, 46, 11-13.
- Heffner, R.S. (2007) Speaking out about US science output. *Science*, 318, 913 (letter to the editor).
- Heffner, R.S., Koay, G., Heffner, H.E. (2007) Sound-localization acuity and its relation to vision in large and small fruit-eating bats: I. Echolocating species, *Phyllostomus hastatus* and *Carollia perspicillata*. *Hearing Research*, 234, 1- 9.
- Heffner, R.S., Koay, G., Heffner, H.E. (2008) Sound-localization acuity and its relation to vision in large and small fruit-eating bats: II. Non-echolocating species, *Eidolon helvum* and *Cynopteris brachiotis*. *Hearing Research*, 241, 80-86.
- Heffner, H. E., Koay, G., and Heffner, R. S. (2008). Comparison of Behavioral and Auditory Brainstem Response Measures of Sensorineural Hearing Loss in Rats. *Journal of the Acoustical Society of America*, 124, 1093-1104.
- Heffner, R.S., Koay, G., Heffner, H.E. (2010) Use of binaural cues for sound localization in two non-echolocating bats: The Straw-colored fruit bat (*Eidolon helvum*), and the Dog-faced fruit bat, (*Cynopterus brachyotis*). *Journal of the Acoustical Society of America*, 127, 3837-3845.
- Heffner, R.S., Koay, G., Heffner, H.E. (2010) Use of binaural cues for sound localization in two species of Phyllostomidae: The Greater spear-nosed bat, *Phyllostomus hastatus* and the Short-tailed fruit bat, *Carollia perspicillata*. *Journal of Comparative Psychology*, 124, 447-454.
- Wesolek, C., Koay, G., Heffner, R.S., Heffner, H.E. (2010) Laboratory rats (*Rattus norvegicus*) do not use binaural phase differences to localize sound. *Hearing Research*, 265, 54-62.
- Heffner, H.E., Heffner, R.S. (2010) Response to Manley: An evolutionary perspective on middle ears. *Hearing Research*, 270, 1.
- Heffner, R.S., Heffner, H.E. (2010) Explaining high-frequency hearing. *Anatomical Record*, 293, 2080-2082.
- Heffner, H. E., Koay, G., Hill, E. M., and Heffner, R. S. (2013). Conditioned suppression/avoidance as a method for testing hearing in birds: the domestic pigeon (*Columba livia*). *Behavior Research Methods*, 45, 383-392.
- Heffner, R.S., Koay, G., Heffner, H.E. (2013) Hearing in American leaf-- nosed bats. IV: The Common vampire bat, *Desmodus rotundus*. *Hearing Research*, 296, 42-50.
- Heffner, R.S., Koay, G., Heffner, H.E. (2014) Hearing in Alpacas (*Vicugna pacos*): Audiogram, localization acuity, and use of binaural locus cues. *Journal of Acoustical Society of America*, 135, 778-788.
- Hill, E. M., Koay, G., Heffner, R. S., & Heffner, H. E. (2014). Audiogram of the Chicken (*Gallus gallus domesticus*) from 2 Hz to 9 kHz. *Journal of Comparative Physiology A*, 200, 863-870.
- Heffner, R.S., Koay, G., and Heffner, H.E. (2015) Sound localization in common vampire bats: Acuity and use of the binaural phase cue by a small mammal. *J. Acoust. Soc. Am.*, 37, 42-52.
- Heffner, R. (2015) Testing the hearing abilities of animals. Published online by the Speech-Language-Hearing Association of Virginia.
<https://www.shav.org/conference/handouts/session-20.pdf>

- Heffner, H. E. & Heffner, R. S. (2016). The evolution of mammalian sound localization. *Acoustics Today*, 12, 20-27, 35.
- Godfrey, D.A., Lee, A.C., Hamilton, W.D., Benjamin, L.C., Vishwanath, S., Simo, H., Godfrey, L.M., Mustapha, A., Heffner, R.S. (2016) Volumes of cochlear nucleus regions in rodents. *Hearing Research*, 339, 161-174.
- Heffner, H. E., Koay, G., & Heffner, R. S. (submitted). Budgerigars (*Melopsittacus undulates*) do not hear infrasound: The audiogram from 8 Hz to 10 kHz. *Journal of Comparative Physiology A*.

Book Chapters:

- Heffner, R. S., and Masterton, R. B. (1990). Sound localization in mammals: Brain-stem mechanisms. M.A. Berkley and W.C. Stebbins (Eds.) *Comparative perception, Vol I: Basic Mechanisms*. (pp. 285-314). New York: Wiley & Sons.
- Heffner, R. S. & Heffner, H. E. (1992). Evolution of sound localization in mammals. In A. N. Popper, R. R. Fay, and D. B. Webster (Eds.), *The Evolutionary Biology of Hearing*. New York, Springer-Verlag, 691-716.
- Heffner, H. E. & Heffner, R.S. (1992). Auditory perception in farm animals. In C.J.C. Phillips and D. Piggins (Eds.) *Farm Animals and the Environment*, C.A.B. International, Wallingford, UK, 159-184.
- Heffner, H.E. & Heffner, R.S. (1995) Conditioned avoidance. In G.M. Klump, R.J. Dooling, R.R. Fay, and W.C. Stebbins (Eds.), *Methods in Comparative Psychoacoustics*, Basel , Birkhäuser, 73-87.
- Heffner, H.E. & Heffner, R.S. (1994) Lateralization of the perception of communicative vocalizations in Japanese macaques. In J.R. Anderson, J.J. Roeder, B. Thierry, and N. Herrenschildt (Eds.) *Current Primatology, Vol.III, Behavioural Neuroscience, Physiology, and Reproduction*, Strasbourg, Universite Louis Pasteur, 1-8.
- Heffner, H.E. & Heffner, R.S. (1995) Role of auditory cortex in the perception of communicative vocalizations by Japanese macaques. In E.Zimmermann, J. Newman, and U. Juergens (Eds.), *Current Topics in Primate Vocal Communication*. New York, Plenum, 207-219.
- Heffner, H.E., and Heffner, R.S. (1998) Hearing. in G. Greenberg and M. Haraway (eds.) *The Encyclopedia of Comparative Psychology*, New York, Garland, 290-303.
- Heffner, R.S., Koay, G., and Heffner, H.E. (2001) Sound-localization acuity changes with age in C5BL/6J mice. in J. Willott (ed.) *The Auditory Biology of the Laboratory Mouse: From Behavior to Molecular Biology*. CRC Press, New York, 31-35.
- Heffner, H.E., and Heffner, R.S. (2001) Behavioral assessment of hearing in mice. in J. Willott (ed.) *The Auditory Biology of the Laboratory Mouse: From Behavior to Molecular Biology*. CRC Press, New York, 19-29.
- Heffner, H.E. And Heffner, R.S. (2003) Audition. In: S. Davis, (Ed.) *Handbook of Research Methods in Experimental Psychology*. Blackwell, Boston Mass. 413-440.
- Heffner, H. E., Koay, G., and Heffner, R.S. (2006) Behavioral assessment of hearing in mice – Conditioned suppression. In. J. Crowley et al. (Eds.) *Current Protocols in Neuroscience*. Wiley & Sons: NY, pp. 8.21D.1 - 8.21D.15.
- Heffner, H.E., and Heffner, R.S. (2008) *High-Frequency Hearing*. In: P. Dallos, D. Oertel, and R. Hoy (Ed.) *Handbook of the Senses: Audition*. Elsevier, The Netherlands, 55-60.
- Heffner, H. E. & Heffner, R. S. (2012) Behavioral tests for tinnitus in animals. In J. J. Eggermont, R. R. Fay, & A. N. Popper (Eds.) *Tinnitus*. Springer Handbook of Auditory Research, pp. 21-58.

Heffner, H. E. & Heffner, R. S. (2014). The behavioral study of mammalian hearing. In A. N. Popper & R. R. Fay (Eds.) *Perspectives on Auditory Research*. Springer: NY, pp. 269-285.

Invited Presentations:

Heffner, R.S. (Jan. 1992) Hearing and Seeing. Psychobiology Colloquium, Florida State Univ.

Heffner, R.S. (Jan. 1992) Problems in Animal Psychophysics. Psychobiology Lunch Seminar, FLORIDA STATE UNIVERSITY.

Heffner, R.S. (Nov. 1992) The role of vision in the evolution of hearing. Psychology colloquium DALHOUSIE UNIVERSITY, CANADA.

Heffner, R.S. (June 16, 1993) Variation in sound localization and the superior olivary complex. Conference on brainstem mechanisms of sound localization, OTTAWA, CANADA.

Heffner, R.S. (July 6, 1995) The comparative study of sound localization in mammals and its anatomical correlates. IBRO Satellite Symposium on Processing in Auditory and Language Cortex, Katsuki Memorial, SAPPORO, JAPAN.

Heffner, R.S. (July 11, 1995) Vision and the evolution of sound localization in mammals. ATR, NARA, JAPAN.

Heffner, R.S. (Dec.8, 1995) Vision and the evolution of sound localization in mammals. Visionaries Colloquium, Dept. of Psychology, VANDERBILT, UNIVERSITY.

Heffner, R.S. (1998) Sound localization in mammals. Abstracts of the Twenty-first Meeting of the Association for Research in Otolaryngology, 106.

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