

VITA

General Information

HENRY E. HEFFNER

Date of Information: August 15, 2016

Current Principal Job Title

Professor, Dept. of Psychology, Univ. of Toledo, Toledo, OH 43606

Educational Experience

B.A., Trinity College, Hartford CT, Psychology, 1966

M.S., Florida State University, Psychology, 1969

Ph.D., Florida State University, Psychobiology, 1973

Honors, Memberships and Affiliations

Distinguished Graduate Award, Neuroscience Program, Florida State University, Awarded 1984

American Psychological Association, Fellow 1986

Association for Psychological Science, Fellow 1988

Association for Research in Otolaryngology, Member

Neuroscience Society, Member

Fields of Present Major Scientific Interest

Function of auditory cortex; Comparative study of hearing; Tinnitus, Ethics of animal research

Related Training and Professional Experience

National Institutes of Health Pre-doctoral Research Fellow, 1970-71

Research Fellow, Neurocommunications Research Unit, University of Birmingham, England, 1971-72

Research Associate, Biomedical Engineering, Johns Hopkins University, 1972-73

Research Associate, Bureau of Child Research, University of Kansas, 1973-1978

Courtesy Faculty, Department of Speech and Hearing, University of Kansas, 1975-1987

Associate Scientist, Bureau of Child Research, University of Kansas, 1978-1985

Associate in Mammalogy, Museum of Natural History, University of Kansas, 1984-1987

Senior Scientist, Bureau of Child Research, University of Kansas, 1985-1987

Associate Professor, Department of Psychology, University of Toledo, 1987-1992

Professor, Department of Psychology, University of Toledo, 1992-present

Ad Hoc Reviewer

John E. Fogarty International Center for Advanced Study in the Health Sciences

National Institutes of Health

National Science Foundation

United States-Israel Binational Science Foundation

American Journal of Primatology
 Animal Behaviour
 Applied Animal Behavior
 Audiology and Neuro-Otology
 Behavioural Brain Research
 Behavioral Ecology and Sociobiology
 Behavioral Neuroscience
 Biomed Central Neuroscience
 Brain, Behavior and Evolution
 Brain Research
 Cerebral Cortex
 European Journal of Neuroscience
 Experimental Biology
 Experimental Brain Research
 Frontiers in Systems Neuroscience
 Functional Ecology
 Genes, Brain and Behavior
 Hearing Research
 JASA Express Letters
 Journal of the American Association of Laboratory Animal Care
 Journal for the Association for Research in Otolaryngology
 Journal of the Acoustical Society of America
 Journal of Comparative Psychology
 Journal of Comparative Physiology A
 Journal of the Experimental Analysis of Behavior
 Journal of Experimental Biology
 Journal of Neurophysiology
 Journal of Neuroscience
 Journal of Neuroscience Methods
 Journal of Neuroscience Research
 Neurobiology of Learning and Memory
 Neuroscience
 Otology and Neurotology
 PLOS ONE
 Science

Supplemental Information

Grants Awarded (Extramural)

NIH Research Grant R01 NS 12992, "Behavioral analysis of the role of auditory cortex." Principal Investigator. Awarded 1976-1978. Renewed 1978-1981. Renewed 1981-1985. Renewed 1985-1990.
 NIH Core Center Grant HD 02528 "Program for a research center in mental retardation." Co-Principal Investigator. 1976-1987.
 NSF Grant, BNS 78-07391, "Hearing in large mammals." Co-Principal Investigator (with R. Heffner). May 1978-October 1980.

- Deafness Research Foundation, "Hearing in Reptiles." Co-Principal Investigator (with R. Heffner). January 1, 1981-December 31, 1982.
- NIH Research Grant R01 NS 17850, "Comparative study of sound localization in mammals." Co-Investigator (R. Heffner, Principal Investigator). Awarded 1982-1985. Renewed 1985-1988. Renewed 1988-August 1994. \$716,352
- NIH Research Grant R01 NS 12992, "Behavioral analysis of the role of auditory cortex." Principal Investigator. Transferred to the University of Toledo, 1987-1990. \$230,869
- NIH Research Grant R01 NS 30539, "The neurology of communication in nonhuman primates." Principal Investigator (R. Heffner, Co-Investigator). August 1, 1992 - July 31, 1997. \$505,646
- NIH Research Grant Supplement for Underrepresented Minority Assistants, August 1, 1994 - July 31, 1996. \$11,097
- NIH Research Grant R01 DC 02960, "Evolution of sensory systems in bats." Co-Investigator (R. Heffner, Principal Investigator). May 1996 - April, 2001. \$653,123
- United States-Israel Binational Science Foundation Grant No. 95-00188, "Cross-modal neuroplasticity in blind hamsters." Co-Principal Investigator (with R. Heffner and Z. Wollberg of Tel Aviv University). August 1, 1996 - July 31, 1999. \$43,500
- NIH Research Grant R21 DC03258, "Central mechanisms related to tinnitus." Co-Principal Investigator (with J. Kaltenbach of Wayne State University, and D. Godfrey of the Medical College of Ohio). January 1, 1997 - December 31, 1998. Renewed July 1, 1999 - June 30, 2004. \$698,167
- Tinnitus Research Consortium, A neural correlate of tinnitus. Co-Investigator (T. J. Imig, P.I., subcontract with the University of Kansas Medical Center). July 1, 2005-June 30, 2007. \$80,404
- NIH Research Grant R21 DC006629, Developing techniques for studying tinnitus in animals. Principal Investigator. December 1, 2005 - November 30, 2009. \$396,000

Grants Awarded (Intramural)

- University of Kansas, Biomedical Sciences Support Award, "Behavioral analysis of the role of auditory cortex." Principal Investigator. May 1978-November 1978.
- DMHRS, State of Kansas, "Experimental investigation of auditory agnosia." Principal Investigator. July 1978-June 1979.
- University of Kansas, Biomedical Sciences Support Award, "Psychobiology laboratory microscope." Principal Investigator. January 16, 1979-July 31, 1979.
- University of Kansas, Biomedical Sciences Support Award, "Effect of auditory cortex lesions on hearing in monkeys." Principal Investigator. September 1, 1985-February 28, 1986.
- University of Toledo, Ohio Board of Regents Research Challenge Program, "Auditory brainstem response audiometry." Co-Principal Investigator (with R. Heffner). December 1, 1987-November 30, 1988.
- University of Toledo, Biomedical Sciences Support Award, "Behavioral analysis of the role of auditory cortex." Principal Investigator. May 1, 1991-April 30, 1992.
- University of Toledo, Biomedical Sciences Support Award, "The neurology of communication in nonhuman primates." Principal Investigator. April 30, 1993-April 30, 1994.
- University of Toledo, deArce Award, "Animal model of tinnitus." Principal Investigator, March 1996-February, 1997.
- University of Toledo, deArce Award, Determining the pitch of tinnitus in rats exposed to loud sound. @ Principal Investigator, June 1, 2005- June 30, 2006.
- Translational Research Stimulation Award, UT-ProMedica Collaborative Project, Co-Principal Investigator (with A. Benson, M.D.). "Identifying drugs that affect tinnitus." May 2013 - May 2014.

Publications

Articles

- Ravizza, R., Heffner, H., & Masterton, B. (1969). Hearing in primitive mammals, I: Opossum (*Didelphis virginianus*). *Journal of Auditory Research*, 9, 1-7.
- Ravizza, R., Heffner, H., & Masterton, B. (1969). Hearing in primitive mammals, II: Hedgehog (*Hemiechinus auritus*). *Journal of Auditory Research*, 9, 8-11.
- Heffner, H., Ravizza, R., & Masterton, B. (1969). Hearing in primitive mammals, III: Tree shrew (*Tupaia glis*). *Journal of Auditory Research*, 9, 12-18.
- Heffner, H., Ravizza, R., & Masterton, B. (1969). Hearing in primitive mammals, IV: Bushbaby (*Galago senegalensis*). *Journal of Auditory Research*, 9, 19-23.
- Masterton, B., Heffner, H., & Ravizza, R. (1969). The evolution of human hearing. *Journal of the Acoustical Society of America*, 45, 966-985.
- Heffner, H., & Masterton, B. (1970). Hearing in primitive primates: Slow Loris (*Nycticebus coucang*) and Potto (*Perodicticus potto*). *Journal of Comparative and Physiological Psychology*, 71, 175-182.
- Heffner, R., Heffner, H., & Masterton, B. (1971). Behavioral measurements of absolute and frequency difference thresholds in guinea pig. *Journal of the Acoustical Society of America*, 4, 1888-1895.
- Thompson, G., Heffner, H., & Masterton, B. (1974). An automated localization chamber. *Behavior Research Methods and Instrumentation*, 6, 550-552.
- Heffner, H., & Masterton, B. (1975). Role of auditory cortex for sound localization in the monkey (*Macaca mulatta*). *Journal of Neurophysiology*, 38, 1340-1358.
- Heffner, H., & Whitfield, I. C. (1976). Perception of the missing fundamental by cats. *Journal of the Acoustical Society of America*, 59, 915-919.
- Hocherman, S., Benson, D. A., Goldstein, M. H., Jr., Heffner, H. E., & Hienz, R. D. (1976). Evoked unit activity in auditory cortex of monkeys performing a selective attention task. *Brain Research*, 117, 51-68.
- Heffner, H. (1978). Effect of auditory cortex ablation on localization and discrimination of brief sounds. *Journal of Neurophysiology*, 41, 963-976.
- Heffner, R., & Heffner, H. (1980). Hearing in the elephant (*Elephas maximus*). *Science*, 208, 518-520.
- Heffner, H., & Masterton, B. (1980). Hearing in glires: domestic rabbit, cotton rat, feral house mouse, and kangaroo rat. *Journal of the Acoustical Society of America*, 68, 1584-1599.
- 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. S., & Heffner, H. E. (1982). Hearing in the elephant: Absolute sensitivity, frequency discrimination, and sound localization. *Journal of Comparative and Physiological Psychology*, 96, 926-944.
- Heffner, R. S., & Heffner, H. E. (1983). Hearing in large mammals: Horses (*Equus caballus*) and cattle (*Bos taurus*). *Behavioral Neuroscience*, 97, 299-309.
- Heffner, H. E. (1983). Hearing in large and small dogs: Absolute thresholds and size of the tympanic membrane. *Behavioral Neuroscience*, 97, 310-318.
- Heffner, H. E., & Heffner, R. S. (1983). The hearing ability of horses. *Equine Practice*, 5, 27-32.
- Heffner, R. S., & Heffner, H. S. (1983). Effect of cattle ear mite (*Raillietia auris*) infestation on hearing in a cow. *Journal of the American Veterinarian Medical Association*, 182, 612-614.
- Heffner, R. S., & Heffner, H. E. (1983). Occurrence of the cattle ear mite (*Raillietia auris*) in Southeastern Kansas. *The Cornell Veterinarian*, 73, 193-199.

- Heffner, H. E., & Heffner, R. S. (1984). Sound localization in large mammals: Localization of complex sounds by horses. *Behavioral Neuroscience*, 98, 541-555.
- Heffner, H. E., & Heffner, R. S. (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, H. E., & Heffner, R. S. (1985). Sound localization in wild Norway rats (*Rattus norvegicus*). *Hearing Research*, 19, 151-155.
- Heffner, R. S. & Heffner, H. E. (1985). Hearing range of the domestic cat. *Hearing Research*, 19, 85-88.
- 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 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, H. E. (1987). Ferrier and the study of auditory cortex. *Archives of Neurology*, 44, 218-221.
- 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 the use of binaural cues by the gerbil (*Meriones unguiculatus*). *Behavioral Neuroscience*, 102, 422-428.
- Kelly, M. B., & Heffner, H. E. (1988). The role of attention in the elimination of chronic, life-threatening vomiting. *Journal of Mental Deficiency*, 32, 425-431.
- 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 cortical 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 and 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 pigs (*Sus scrofa*) and goats (*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.
- 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 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). Hearing and sound localization in blind mole rats. *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, R.S., Heffner, H.E., Contos, C., & Kearns, D. (1994). Hearing in prairie dogs: transition between surface and subterranean rodents. *Hearing Research*, 73, 185-189.
- Heffner, H. E., Heffner, R. S., Contos, C., & Ott, T. (1994). Audiogram of the hooded Norway rat. *Hearing Research*, 73, 244-247.
- Heffner, R. S., Heffner, H. E., Kearns, D., Vogel, J. & 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. *Hearing Research*, 99, 13-21.
- Jackson, L. 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, H. E. (1997). The role of macaque auditory cortex in sound localization. *Acta Oto-Laryngologica Supplement*, 532, 22-27.
- Heffner, H. E. (1998). Auditory awareness in animals. *Applied Animal Behaviour Science*, 57, 259-268.
- Koay, G., Kearns, D, Heffner, R. S., and Heffner, H. E. (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 the relation to vision. *Journal of Comparative Psychology*, 113, 297-306.
- Heffner, H. E. (1999). The symbiotic nature of animal research. *Perspectives in Biology and Medicine*, 43, 128-139.
- 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 frugivorous 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 behavior of macaques with auditory cortex lesions. *NeuroReports*, 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.
- Heffner, H. E. and Harrington, I. A. (2002). Tinnitus in hamsters following exposure to loud sound. *Hearing Research*, 170, 83-95.
- 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., and Heffner, H.E. (2002). Behavioral audiograms of homozygous med^J mutant mice with sodium channel deficiency and unaffected controls. *Hearing Research*, 171, 111-118.
- 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, H. E. and Heffner, R. S. (2004). Response to J. Guo and Y. Chen. *Hearing Research*, 198, 146-147.
- Heffner, H. E. and Koay, G. (2005). Tinnitus and hearing loss in hamsters exposed to loud sound. *Behavioral Neuroscience*, 119, 734-742.
- Heffner, H. E. 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., Koay, G. and 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 *Cynopterus brachyotis*. *Hearing Research*, 241, 80-86.
- Heffner, H. E., Koay, G., and Heffner, R. S. (2008). Comparison of behavioral and auditory brainstem response measures of threshold shift in rats exposed to loud sound. *Journal of the Acoustical Society of America*, 124, 1093-1104.
- Heffner, H. Jr., and Heffner, H. E. (2010). The behavioral audiogram of whitetail deer (*Odocoileus virginianus*). *Journal of the Acoustical Society of America*, 127, EL111-EL114.
- Heffner, R. S., Koay, G., and Heffner, H. E. (2010). Use of binaural cues for sound localization in large and small non-echolocating bats: *Eidolon helvum* and *Cynopterus brachyotis*. *Journal of the Acoustical Society of America*, 127, 3837-3845.
- Wesolek, C., M., Koay, G., Heffner, R. S., and Heffner, H. E. (2010). Laboratory rats (*Rattus norvegicus*) do not use binaural phase differences to localize sound. *Hearing Research*, 265, 54-62.
- Heffner, R. S., Koay, G., and 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
- Heffner, H. E. and Heffner, R. S. (2010). Response to Manley: An evolutionary perspective on middle ears. *Hearing Research*, 270, 1.

- Heffner, R. S. and Heffner, H. E. (2010). Explaining high-frequency hearing. *Anatomical Record*, 293, 2080-2082.
- Heffner, H. E. (2011). A two-choice sound-localization procedure for detecting lateralized tinnitus in animals. *Behavior Research Methods*, 43, 577-589.
- 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 the 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., & Heffner, H. D. (2015). Sound localization in common vampire bats: Acuity and use of the binaural time cue by a small mammal. *Journal of the Acoustical Society of America*, 137, 42-52.
- Heffner, H. (2015). Testing for tinnitus in animals. Published online by the Speech-Language-Hearing Association of Virginia, 1-8. <https://www.shav.org/conference/handouts/session-25.pdf>
- Heffner, H. E. & Heffner, R. S. (2016). The evolution of mammalian sound localization. *Acoustics Today*, 12, 20-27, 35.
- Heffner, H. E., Koay, G., & Heffner, R. S. (under review). Budgerigars (*Melopsittacus undulates*) do not hear infrasound: The audiogram from 8 Hz to 10 kHz. *Journal of Comparative Physiology A*.

Chapters

- Heffner, H., & Masterton, B. (1978). Contribution of auditory cortex to hearing in the monkey (*Macaca mulatta*). In D. J. Chivers & J. Herbert (Eds.), *Recent advances in primatology--Vol. I, Behaviour*. (pp. 735-754). New York: Academic Press.
- Heffner, H., Heffner, R. (1980). Research into elephant hearing. *American Association of Zoological Parks and Aquariums Central Regional Workshop Proceedings*, 23-29.
- Heffner, H. E., & Heffner, R. S. (1990). Role of primate auditory cortex in hearing. In W. C. Stebbins & M. Berkley (Eds.), *Comparative perception, Vol. II: Communication*. (pp. 279-310). New York: Wiley & Sons.
- Heffner, R. S., & Heffner, H. E. (1992). Evolution of sound localization in mammals. In D. B. Webster, R. R. Fay, and A. N. Popper (Eds.), *The Evolutionary Biology of Hearing*. (pp. 691-715). New York: Springer-Verlag.
- Heffner, H. E., & Heffner, R. S. (1992). Auditory perception. In C. Phillips and D. Piggins (Eds.), *Farm Animals and the Environment*. (pp.159-184). Wallingford UK: CAB International.
- 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*. (pp. 1-8). Strasbourg: Universite Louis Pasteur.
- 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*. (pp. 73-87). Birkhäuser:Basel.
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Comparative Psychology, A Handbook. (pp. 290- 303). Garland: New York.

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- Heffner, H. E. (1993). Review of The Mammalian Auditory Pathway: Neuroanatomy. D. B. Webster, A. N. Popper, and R. R. Fay (Eds.). New York: Springer-Verlag, 1992. *Quarterly Review of Biology*, 68, 459-460.

Invited Papers

- Heffner, H., & Heffner, R. (1980, March). Research into elephant hearing. American Association of Zoological Parks and Aquariums Central Regional Workshop.
- Heffner, H., & Heffner, R. (1980, April). The comparative study of mammalian hearing. Southwestern Psychological Association, Twenty-sixth Annual Convention.
- Heffner, H. (1981, May). Role of the forebrain in sound localization. Acoustical Society of America, 101st Meeting. (Abstract: *Journal of the Acoustical Society of America*, 1981, 69, S12.)
- Heffner, H. E. (1986, August). Role of auditory cortex in hearing. American Psychological Association, Ninety-fourth Annual Convention. Washington, D.C.
- Heffner, H. E., & Heffner, R. S. (1988, August). Role of cortex in the perception of vocal communications. American Psychological Association, Ninety-sixth Annual Convention. Atlanta, GA.

- Heffner, R. S., & Heffner, H. E. (1990, May). Evolution of sound localization in mammals. International Conference on the Evolutionary Biology of Hearing, May 20-24, 1990, Sarasota, FL.
- Heffner, H. E. (1990, October). Lateralization of the perception of species-specific vocalizations by Japanese macaques. Conference on Laterality: Evolution and Mechanism, October 18-21, 1990, Memphis, TN.
- Heffner, H. E. (1991, August). Effects of superior temporal gyrus lesions in monkeys on auditory function. Third IBRO World Congress of Neuroscience, August 4-9, Montreal, Quebec, Canada.
- Heffner, R. S., & Heffner, H. E. (1991, September). Auditory perception. International Conference on Farm Animals and the Environment, September 4-6, 1991, Bangor, Wales, UK.
- Heffner, H. E., & Heffner, R. S. (1992, August). Lateralization of the perception of communicative vocalizations in Japanese macaques. XIVth Congress of the International Primatological Society, August 16-21, 1992, Strasbourg, France. (Abstract: *Abstracts of the XIVth Congress of the International Primatological Society*, 1992, 99.)
- Heffner, H. E., & Heffner, R. S. (1992, August). The role of auditory cortex in the perception of communicative vocalizations in Japanese macaques. XIVth Congress of the International Primatological Society, August 16-21, 1992, Strasbourg, France. (Abstract: *Abstracts of the XIVth Congress of the International Primatological Society*, 1992, 227.)
- Heffner, H. E. (1995, July). The role of macaque auditory cortex in sound localization. IBRO Satellite Symposium, Processing in Auditory and Language Cortex: Katsuki Memorial, July 6-7, 1995, Hokkaido University, Sapporo, Japan.
- Heffner, H. E. (1998, February). The role of auditory cortex in sound localization. Twenty-first Meeting of the Association for Research in Otolaryngology (Abstract: *Abstracts of the Twenty-first Meeting, ARO*, p. 107).
- Heffner, H. E. (2003, September). The neurobehavioral study of auditory cortex. Conference title: Auditory Cortex - Towards a Synthesis of Human and Animal Research. Magdeburg, Germany.
- Heffner, H. E. (2005, May). The symbiotic nature of animal research. Midwestern Psychological Association, Chicago, IL USA. (Abstract: *Program, 77th Annual Meeting of the Midwestern Psychological Association*, p. 114.)
- Heffner, H. E. (2005, May). How do you know what an animal can hear? 149th Meeting of the Acoustical Society of America, Vancouver, Canada. (Abstract: *Journal of the Acoustical Society of America*, 2005, vol. 117, p. 2582.)
- Heffner, H. E. and Heffner, R. S. (2007). Evolution of mammalian hearing. 153rd meeting of the Acoustical Society of America, June 4-8, 2007. (Abstract: *Journal of the Acoustical Society of America*, 2007, vol. 121, p. 3052.)
- Heffner, H. (2015). Testing for tinnitus in animals. Speech-Language-Hearing Association of Virginia, March 26, Session 25, 3:45-4:45 pm.

Papers Presented

- Masterton, B., Ravizza, R., & Heffner, H. (1969). Hearing in primitive mammals. *Journal of the Acoustical Society of America*, 45, 299.
- Heffner, H., Thurston, E., & Masterton, B. (1969). Hearing in prosimians. *Journal of the Acoustical Society of America*, 45, 299.
- Heffner, H., VanOeveren, R., & Masterton, B. (1971). Hearing in two species of wild rodents. *Journal of the Acoustical Society of America*, 50, 148.
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- Heffner, H., & Masterton, B. (1975). Effect of auditory cortex ablation on sound localization in the monkey. *Journal of the Acoustical Society of America*, 58, 565.
- Heffner, H. (1975). Perception of meaningful sounds by dogs. *Journal of the Acoustical Society of America*, 58, 124.
- Heffner, H. (1976). Effect of auditory cortex ablation on the localization and discrimination of brief sounds. *Neuroscience Abstracts*, 2, 17.
- Heffner, H. (1976). Hearing in large and small dogs (*Canis familiaris*). *Journal of the Acoustical Society of America*, 60, S88.
- Heffner, H. (1977). Hearing and sound localization in the kangaroo rat (*Dipodomys merriami*). *Journal of the Acoustical Society of America*, 61, S59.
- Heffner, H. (1977). Effect of auditory cortex ablation on the perception of meaningful sounds. *Neuroscience Abstracts*, 3, 6.
- Heffner, R., Heffner, H., & Stichman, N. (1979). Hearing in the elephant (*Elephas maximus*). *Journal of the Acoustical Society of America*, 65, S55.
- Heffner, R., & Heffner, H. (1980, May). Sound localization in the elephant (*Elephas maximus*). Midwestern Psychological Association, Fifty-second Annual Meeting.
- Heffner, R., & Heffner, H. (1980, September). Hearing in large mammals: Domestic horses and cattle. American Psychological Association, Eighty-eight Annual Meeting.
- Heffner, R. S., & Heffner, H. E. (1981). Localization of clicks, noise bursts, and tones by an Indian elephant. *Journal of the Acoustical Society of America*, 69, S64.
- Heffner, R. S., & Heffner, H. E. (1983). Sound localization acuity in mammals and its relation to visual fields. *Journal of the Acoustical Society of America*, 73, S42.
- Heffner, H. E., & Heffner, R. S. (1983). Sound localization and high-frequency hearing in horses. *Journal of the Acoustical Society of America*, 73, S42.
- Heffner, H. E., & Heffner, R. S. (1983). Effect of cortical ablation on the perception of species-specific vocalizations by Japanese macaques. I.U.P.S. Satellite Symposium on Mechanisms of Hearing, Monash University, Melbourne, Australia. (In W. R. Webster & L. M. Aitkin (Ed.), *Mechanisms of Hearing*, Monash University Press, Clayton, Victoria, Australia, 1983, 134.
- Heffner, H. E., & Heffner, R. S. (1984). Role of auditory cortex in the perception of vocalizations by Japanese macaques. *Abstracts of the Seventh Midwinter Meeting of the Association for Research in Otolaryngology*, 120.
- Heffner, R. S., & Heffner, H. E. (1984). Cortical deafness in Japanese macaques following bilateral auditory cortex ablation. *Abstracts of the Seventh Midwinter Meeting of the Association for Research in Otolaryngology*, 113.
- Heffner, H. E., Heffner, R. S., & Porter, W. E. (1985). Effect of auditory cortex lesions on absolute thresholds in macaques. *Neuroscience Abstracts*, 11, 250.
- Heffner, R. S., & Heffner, H. E. (1985). Auditory localization and visual fields in mammals. *Neuroscience Abstracts*, 11, 547.
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- Heffner, R. S., & Heffner, H. E. (1987). Auditory function in albino cats. *Abstracts of the Tenth Midwinter Meeting of the Association for Research in Otolaryngology*, 217.
- Heffner, R. S., Richard, M. M., & Heffner, H. E. (1987). Hearing and the auditory brainstem in a fossorial mammal, the pocket gopher. *Neuroscience Abstracts*, 13, 546.
- Heffner, H. E., & Heffner, R. S. (1988). Effect of bilateral auditory cortex lesions in monkeys on sound localization. *Abstracts of the Eleventh Midwinter Meeting of the Association for Research in Otolaryngology*, 85.
- Heffner, R. S., & Heffner, H. E. (1988). Interaural phase and intensity discrimination in the horse using dichotically presented stimuli. *Abstracts of the Eleventh Meeting of the Association for Research in Otolaryngology*, 233.
- Heffner, R. S., & Heffner, H. E. (1988). The relation between vision and sound localization acuity in mammals. *Neuroscience Abstracts*, 14, 1096.
- Heffner, H. E., & Heffner, R. S. (1988). Cortical deafness cannot account for "sensory aphasia" in Japanese macaques. *Neuroscience Abstracts*, 14, 1099.
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- Heffner, H. E., & Mooney, S. E. (1989). The ability of a single hemisphere to process input from the two ears. *Abstracts of the Twelfth Meeting of the Association for Research in Otolaryngology*, 99.
- Heffner, H. E., & Mooney, S. E. (1989). Effect of unilateral auditory cortex ablation on the ability of macaques to perceive dichotically presented vocalizations. *Neuroscience Abstracts*, 15, 112.
- Heffner, R. S., & Heffner, H. E. (1990). The importance of high frequencies for sound localization in mammals. *Abstracts of the Thirteenth Meeting of the Association for Research in Otolaryngology*, 110.
- Mooney, S. E., Heffner, H. E., & Heffner, R. S. (1990). Hearing in two species of rodents: Darwin's leaf-eared mouse (*Phyllotis darwini*) and the spiny mouse (*Acomys cahirinus*). *Abstracts of the Thirteenth Meeting of the Association for Research in Otolaryngology*, 176.
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- Heffner, R. S., & Heffner, H. E. (1991). Hearing in subterranean mammals: naked mole rats *Heterocephalus glaber*. *Abstracts of the Fourteenth Meeting of the Association for Research in Otolaryngology*, 24.
- Heffner, H. E., Carroll, B. A., and Kovach, D. R. (1992). Effect of unilateral ablation of auditory cortex on sound localization by macaques. *Abstracts of the Fifteenth Meeting of the Association for Research in Otolaryngology*, 52.
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- Koay, G., Kearns, D, and Heffner, H. E. (1993). Passive sound localization in the big brown bat, *Eptesicus fuscus*. *International Workshop on Binaural Processing in the Auditory Brainstem*. June 16-19, 1993, Ottawa, Canada.

- Boester, L. L., and Heffner, H. E. (1994). Binaural time and intensity discrimination following unilateral auditory cortex ablation in Japanese macaques. *Abstracts of the Seventeenth Meeting of the Association for Research in Otolaryngology*, 23.
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- Heffner, H. E. (1997). The symbiotic nature of animal research. *Neuroscience Abstracts*, 23, 288.
- Heffner, H. E. (1998). Addressing the issue of animal research in the college classroom. *Neuroscience Abstracts*, 24, 246.
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- Kaltenbach, J. A. and Heffner, H. E. (1999). Spontaneous activity in the dorsal cochlear nucleus of hamsters tested behaviorally for tinnitus. *Abstracts of the Twenty Second Meeting of the Association for Research in Otolaryngology*, 47.
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