

Resource Summary Report

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NICHD Developmental Neuroethology - Laboratory of Comparative Ethology

RRID:SCR_000416

Type: Tool

Proper Citation

NICHD Developmental Neuroethology - Laboratory of Comparative Ethology
(RRID:SCR_000416)

Resource Information

URL: <http://udn.nichd.nih.gov/>

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Description: Understanding the mechanisms underlying the expression and perception of auditory communication in nonhuman primates provides important insights for understanding the neural systems that mediate nonverbal auditory communication in humans. Our research is devoted to understanding the changes in vocal behavior that are associated with maturation and social experience under normative conditions, and to investigating neural systems to define their roles in auditory communication. The anterior cingulate gyrus, in the frontal cerebral cortex, is an essential neural system for the expression of the primate isolation call, a structural and functional equivalent of the cry sounds of humans. Bilateral removal of this structure in adult squirrel monkeys resulted in a long-lasting inability to emit isolation calls. Partial recovery, often over many weeks, initially took the form of production of short, faint and uninflected versions of the typical isolation call. Humans suffering infarct damage to this region likewise show an initial recovery in the form of short, faint, monosyllabic sounds, suggesting that the anterior cingulate gyrus of nonhuman primates is the evolutionary precursor of a neural structure involved in human affective expression and speech. Our working model of isolation call production is that the anterior cingulate gyrus is the site where the command to produce this vocalization is initiated. Since the anterior cingulate region also has reciprocal connections with temporal lobe auditory cortex, a presumptive feedback pathway exists for registering commands to initiate vocalization with the temporal lobe cortex, which plays a major role in perceiving and decoding the acoustic details of species-specific vocalizations. At present, we do not know the role of the anterior cingulate gyrus in the production of infant vocalizations. However, we have found that neonatal removal of the amygdala, an important forebrain component of the limbic system, or portions of the inferotemporal gyrus, which sends projections to the amygdala, result in significant

changes in the vocal behavior of infant rhesus macaques. Vocal development is a dynamic process, and a pattern shared by several nonhuman primates has emerged regarding the nature of this process. Infants are highly vocal during periods of brief separation from their caregiver, and we take advantage of this to document the range of vocalizations produced by infants of different ages. In the neonatal period, infants of 3 species of nonhuman primate (rhesus macaque, squirrel monkey and common marmoset) all produce sounds that vary widely in their acoustic structure. Many of these bear a striking similarity to sounds used in a variety of social settings by adults, suggesting that neural systems responsible for generating adult vocalizations are already in place during early infancy. As infants mature, their vocal behavior during brief periods of social separation becomes much more stereotyped. It isn't until much later in development, as individuals engage in a variety of social interactions with peers and adults, that the sounds expressed in early infancy begin to re-appear in adult contexts. The role of individual experience during development is currently being explored to determine the mechanisms leading to the acquisition of adult vocal skills.

Abbreviations: NICHD Laboratory of Comparative Ethology

Synonyms: Developmental Neuroethology - Laboratory of Comparative Ethology

Resource Type: portal, organization portal, data or information resource, laboratory portal

Keywords: behavior, ethology, development, auditory communication, nonverbal auditory communication, vocal behavior, maturation, social experience, neural system, vocal development, vocal skill, development, infant, amygdala, anterior cingulate gyrus, voice, sound, adult, neuroethology, primate behavior, functional neuroanatomy, atlas

Funding: NICHD

Availability: THIS RESOURCE IS NO LONGER IN SERVICE

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Ratings and Alerts

No rating or validation information has been found for NICHD Developmental Neuroethology - Laboratory of Comparative Ethology.

No alerts have been found for NICHD Developmental Neuroethology - Laboratory of Comparative Ethology.

Data and Source Information

Source: [SciCrunch Registry](#)

Usage and Citation Metrics

We have not found any literature mentions for this resource.