

Sing, Sing, Sing!

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Research indicates that singing has a strong biological basis, appears as song babbling in infants, undergoes regular developmental stages in young children and can facilitate cognitive abilities.

Birds do! Bugs do it! Even gibbons in the trees do it! Let's do it. Let's sing, sing, sing!

Many readers will recognize this as a paraphrase of a popular song of long ago -- Let's Fall In Love". While sex may be almost universal in the Animal Kingdom (don't forget the creatures that don't need a partner to reproduce), love as an almost universal is not so clear. In fact, singing might be more widespread than love.

However, many would disagree. This point of view dismisses grasshopper song as just so much noise, holds that whale singing isn't really all that musical and even regards birdsong as just pleasant twittering. Dismissal of animal song as not being "genuine singing" is typically homocentric. One would have thought the fact that humans are not the center of the Universe, nor our Milky Way galaxy, not our Solar System, not even this "third rock from the sun" should bring at least a moment's pause, if not a bit of humble reflection. The claim that only humans really sing at least raises the question of the definition of singing. Without getting deeply into this issue, we might at least note that research has detailed the musical aspects of the rhythmic/melodic vocalizations of countless species.

Analysis of the animal vocalizations termed "singing" amply attests to their complexity. For, example birdsong is intricate in content and pattern.(1) And interestingly, birdsong is believed by many scientists to provide "... the most adequate model for studying the learning processes of human language." Paralleling the case of human language, songbirds also must hear vocalizations to learn to sing and do so within a critical period of development in order to attain competency. Additionally, birdsong is used to communicate quite specific information to other birds of the same species. Further, different discrete groups of brain cells in songbirds are responsible for different aspects of learning to sing and producing song, as appears to be the case in humans.(2) So there are many commonalties between birdsong and human language.

A second and last example is that of the vocalizations of our primate cousin, the gibbon. These are of sufficient complexity to warrant the term "song" without any great stretch of either the imagination or the language. Thus, the songs of male gibbons are organized "... within a framework of rules that define regular patterns in the placement and order of note types." When the meaning of such songs was determined behaviorally, it was discovered that the "... proper sequential organization of notes is required to encode the meaning of the song...".(3) Don't our songs have similar, if not identical, characteristics?

Neither example is intended to suggest that human song evolved directly from either songbirds or gibbons; neither of these taxa constitute our direct ancestors. Rather, such

findings suggest that human singing is not unique and that it may be biologically based, perhaps in the sense that the hominid capacity for song may have had some selective advantage in the passing on of one's genes. This possibility aside, some workers view song as a stage in the evolution of language. Thus, Bruce Richman, writing in the journal *Contemporary Anthropology*, notes that many researchers categorize human vocalization into two opposed systems, expressive sounds (e.g., sighing, crying, laughing) and speech. Richman believes that a third type of vocalization lies between them -- singing. "Singing and speech seem very different; ... singing is more expressive of emotions than speech." He further holds that the social functions of singing provide something that speaking does not do. "... group singing gives ... a strong, direct feeling of social cohesion and solidarity." Finally, he proposes that singing "... served as an evolutionary transitional state between primate-like vocalizations and speech.(4)

What about human song, particularly in infants and children? The appearance and development of song in infants and children has been studied in some detail. (For very informative broad reviews of musical development see Shuter-Dyson and Gabriel, 1981 and Hargreaves, 1986).(5) During the first year of life, song babbling is evident(6) and recognizable spontaneous singing can be observed as early as six months of age.(7) Ries reported that spontaneous singing at seven months of age was quite distinctive.(8) Researchers have identified a developmental sequence. Early singing consists largely of melodic-rhythmic patterns of contour (pattern of higher and lower notes), without accuracy of pitch. Dowling reports that at approximately two years of age, songs usually consist of the repetition of a single brief melodic phrase, e.g., "Hoppy-hoppy run 'round the road". Complexity increases with age with the addition of more phrases. Recognition of the correct pitch may develop as early as the third year, although singing the correct pitch is usually not present for several years.(9)

Welch has provided a good review of the development of child song, salient features of which are quoted here.(10) After babbling, in which infants often play with "... glissandi and groups of musical pitches and phrases in a repetitive fashion ... words and fragments of song text ... become the focus of attention, followed by certain rhythmic features and, subsequently, the pitch components." The basic learning hierarchy appears to be: "Words -> Rhythm -> Pitch" This develops further: "Pitch Contour -> Individual Phrase Stability -> Overall Key Stability". "By the age of five to six years, young children's singing may have acquired many of the features of the significant adult models."

That key features of adult song are present so early does not imply that songs of young childhood are miniature adult songs. Veldhuis studied the spontaneous singing of four year olds in a free-choice activity period in preschool. She reported that the songs had very clear organizational patterns, unlike adult patterns; they generally had a restricted range of pitch intervals but with distinct brief melodies. Veldhuis further explored the situations in which singing occurred. She found that the children's singing was stimulated by objects, such as musical instruments, and by environmental sounds. Singing was found to often spread through "vocal contagion". Importantly, Veldhuis noted that singing had clear social functions (e.g., communication and cooperation) at this age.(11)

Other detailed observations of naturalistic behavior have documented the spontaneity of singing and other music making in young children. For example, Miller studied three to five year olds in a preschool setting and found that they freely engage in exploring and manipulating melodic and nonmelodic instruments, create songs and imitate rhythms by bodily movements. The children chant and sing to recorded music, without specific instruction or encouragement.(12)

In addition to the systematic description of childsong, a few researchers have also asked whether singing in children has other effects. Positive findings have been reported. For example, ten weeks of group musical activities including singing are reported to increase scores on tests of vocabulary and language in two to five year old developmentally delayed children.(13)

Kalmar reported several positive effects of singing in normal children in a long term study.(14) She examined the effects of the Kodaly method of singing instruction (involving the accompaniment of music with rhythmic movements and the verbal or physical representation of songs) on several measures. Three year olds were assigned either to the experimental group, which received twice-weekly special singing lessons over a three year period, or to the control group, which attended only regular nursery school programs. The experimental group showed greater improvement than the control group on measures of motor development (particularly coordination), abstract conceptual thinking, play improvisation, originality, and verbal abilities. There were no differences in drawing ability or overall IQ between the two groups. The findings both document the potential benefits of singing education on cognitive and motor development and also show that measurable developmental benefits need not involve IQ scores. While these findings are quite provocative, causal attribution to singing *per se* would require a control group that also received enriched experience of a different type. One would hope for follow-up studies.

In summary, while no one would claim that singing in animals is the same as singing in humans, nonetheless animal song has many of the characteristics of human song. And it may be that song is related to the evolution of speech. Observations of the spontaneous behavior of infants and children show that singing is present early in life, exhibits regular developmental stages and serves bio-social roles. Thus, singing may be a biological imperative with both individual and group functions. Quite apart from issues of its biological bases, singing appears capable of promoting several cognitive processes and even motor coordination. But whether or not the benefits prove to be caused exclusively by singing instruction, most parents and teachers would be pleased to have any means of facilitating the mental and physical development of infants and young children. Thus, Kalmar's findings should not be ignored. Additional focused research and application are certainly warranted.

It is fascinating and particularly instructive that infants and children readily make use of the one musical instrument with which they come "equipped", their voices. Perhaps parents, other caregivers and indeed all adults should listen to them more closely, encouraging singing as much as we encourage language. Then the apparently natural

activity and desire of children to sing could be used for their own benefit, both directly musical and indirectly to other aspects of their own development. A fundamental precept is that society has a basic responsibility to help each individual develop to her or his fullest capacity. Singing seems to be a means to promote both musical competence and full development, which clearly are compatible goals.

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