

# The Mysterious Case of Maternal Heartbeat Sounds

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## Aims and Methods

Many people believe that maternal heartbeat sounds dominate the uterine environment and that the fetus, preterm and term newborn prefer them.<sup>1,2,3</sup> This presentation critically examines the literature addressing this belief.

## Results

In 1962, Lee Salk, a psychiatrist in New York City, took a walk through the zoo and noticed a monkey holding her infant close to her body in her left arm “closest to her heart”.<sup>1,2</sup> In 40 out of 42 subsequent observations, this one monkey did the same. With these and data from observations of newly delivered women and their infants, Salk concluded that every primate is imprinted to their mother's heartbeat during infancy because each female holds her own infant on the left to experience “the pleasurable sensation of her own heartbeat reflected back from the infant”. Thus, behavior due to each mother's own imprinting passes it to the next generation.<sup>2,4,5</sup> Extrapolating lavishly, Salk proposed heartbeat sounds as “the basis of all later learning” and that a “universal, ...biological tendency to seek heartbeat sounds has survival value [and] ...involves mutual satisfaction.”<sup>2</sup> Salk's work was influential in bringing the importance of maternal-infant closeness to professional attention.<sup>6</sup>

With numerous, unwitting errors Salk tested the theory of lifetime heartbeat imprinting in a foundling (orphan) hospital<sup>2</sup> by comparing tape recorded nighttime sounds emitted in whole rooms of healthy infants or toddlers. One room had broadcast heartbeat sounds and the other had “no sounds” (actually room sounds) or broadcast lullabies. The conditions were not masked, and baby nurse activities were not reported. Because the number of infants making sounds was not determined, even one infant could account for all room sounds. The heartbeat condition always had fewer sounds (more sleep) than the control conditions.

In 1968 and 1970 several obstetricians sought to extend heartbeat imprinting into fetal life by recording sounds *in utero* from unconscious women in labor.<sup>7,8</sup> Although the results were determined by methodological errors, these are the studies that catapulted intrauterine heartbeat sounds into the popular culture where they remain stuck. The emotionally attractive idea of influential intrauterine sounds accounts, in part, for the dangerous practice of propagating all kinds of sounds in the uterus via speakers attached to the pregnant belly or inserted in the vagina.

A responding study using appropriate methods and equipment did not find heartbeat sounds in the uterus of conscious laboring women with a spinal block but did find room and maternal voice sounds.<sup>9</sup>

Studies of heartbeat recognition in infancy generally show preferential responding to them. However, the findings may be

due to too great a difference between experimental and control sounds;<sup>10,11,12,13</sup> heartbeat sounds may be preferable only because they are simple. But a newborn's ability to make fine discriminations<sup>14,15,16,17,18</sup> enables contrast stimuli differing only in rhythm. There is no clear preference indicating that newborns have not had exposure to heartbeats. (Such a study has not been found.)

Giving up a long-held belief is difficult even when alternatives are substantial.<sup>19</sup> Thankfully, the alternative to intrauterine heartbeats is gold, namely mother's voice. It, and not prominent heartbeats, has been found reliably in the pregnant uterus of humans and ewes.<sup>9,20</sup> Well-known investigators conclude, “mother's voice... [is] the most significant and common mode of potential acoustic stimulation in the uterus.”<sup>20</sup>

## Conclusions

Credible research shows that heartbeat sounds are not distinguishable *in utero* but that discriminable features of mother's voice are prominent – a necessary condition to eventual language acquisition. A broad, moral-of-the-story conclusion is that there is nothing quite like a tour through primary sources to examine a common belief.

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*Adopted by the NFI Board, July 1, 2019*

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*Adopted by the NFI Board, October 20, 2017*