

## How to keep a forest happy? A study on the function of singing behaviour in BaYaka hunter gatherers in Congo

### Origins of music

Why is music so prevalent and universal in human societies? Does music serve an adaptive function, or it is just “auditory cheesecake”, as cognitive psychologist Steven Pinker infamously claimed: a delightful dessert but, from an evolutionary perspective, no more than a by-product of language? The debate on the origins of music has intrigued scientists for centuries. The hypotheses range from music being a mating display in order to woo females, to a means to increase social bonding in group contexts. For the first time, a group of international and interdisciplinary researchers led by Karline Janmaat and her former MSc Student Chirag Chittar, have tested the several hypotheses on music simultaneously in a modern foraging society during their daily search for tubers – their staple food. They found that women during tuber finding events were more likely to sing in large groups of strangers and less likely to sing in large groups of individuals they were close with. The study was part of an elaborate longitudinal study spanning 2 years and has now been published in the scientific journal, *Frontiers in Psychology*.



**A BaYaka group of women and girls singing and clapping enthusiastically while resting during a hectic day's work in the forest (Courtesy: Karline Janmaat 2018).**



**Mbendjele women digging and looking for tubers (*Courtesy;Haneul Jang 2015*).**

Music has always been an evolutionary puzzle as the links to improving fitness in humans have not been direct yet, music has spanned several contexts and has been prevalent across all human societies and performed among all age groups. The researchers decided to test some of the hypotheses that could explain the role of music in a social or group context, in the context of predation, and in a parent-infant context. Their primary selected hypothesis was the credible signalling hypothesis which consists of two aspects namely, the coalition signalling hypothesis and the predation hypothesis. The coalition signalling hypothesis posited that music could have emerged as a reliable signal in showcasing coalition strength (between and among groups), and the intention to cooperate with individuals. Furthermore, the predation hypothesis stated that music could have emerged as a signal to deter possible threats such as dangerous animals including predators. The scientists also accounted for the parent-infant context to test whether these bonds through touch have an impact on singing probability. In order to test this variety of hypotheses, a society was selected that displayed music performance in all the three contexts mentioned above and incorporated these performances as a part of their daily foraging activity. In addition, music production had to be spontaneous and an essential part of life in the studied society. As a result, the researchers tested their hypotheses in a foraging society, the Mbendjele BaYaka in the Republic of Congo.

To study the possible motivations of singing the researchers looked at the probability of singing (whether they would sing or not) in foraging women during tuber foraging expeditions – a daily activity that provides their staple food- and tested the effect of familiarity between individuals, foraging group size, and the duration of carrying a baby (as the women were often accompanied by their baby during foraging). In order to achieve the collection of the required variables, Janmaat and her former PhD student Haneul Jang had conducted unique continuous focal follows of the women whereby, they obtained permission from the women during their foraging trips into the rain forest for exceptional long time periods. They registered the behaviours of these individuals along with other variables including whether they sang or not, how long did they carry an infant during foraging, the



group composition while searching and digging tubers, and the likelihood of encountering dangerous animals.



**BaYaka women and children singing and having some fun while searching for tubers (Courtesy; Jorin Veen 2020).**

### **Importance of singing in groups**

“To understand what motivated the women to sing, we had to understand the group’s dynamics,” says Chirag Chittar, the first author of the paper who conducted this study as a part of his Master thesis at UvA. He elaborates, “The BaYaka are an egalitarian group who share food extensively and live in temporary forest camps with several kin and non-kin individuals including individuals they are not so familiar with. The BaYaka forage for food such as fish, meat, tubers, and mushrooms daily in largely sex-specific but age-general foraging groups. However, they also engage in subsistence crop cultivation and trade. Almost every day the women search for tubers, fish and mushrooms while the men often hunt or climb trees to search for fruits and honey. It were the women that we observed during their search for tubers in groups ranging from 5 to 20 individuals. We categorized the data into 1704 tuber searching and digging bouts which are repetitive units in which a tuber searching and digging activity takes place. This helped us to differentiate between behaviours associated with tuber foraging and behaviours that were not directly associated with foraging like walking between two tuber patches. The bouts are the unit for our research as all the variables are averaged on the level of bouts. Chirag further exclaims, “During our study we found that the BaYaka women sing in 19% of the bouts. During these bouts, the women are carrying an infant in 19% of the bouts.”

### **Evidence for the coalition signalling hypothesis**

The coalition signalling hypothesis (part of the larger credible hypothesis framework) posts that music has originated as a credible signal to indicate coalition strength and cooperative intent to group members. The researchers tested this by looking at the effect between foraging group size and dyadic association index (an index calculated to measure familiarity between individuals). The maximum value of the index would indicate high social closeness between individuals compared to low values which indicated less familiarity between individuals). “Our results reveal that the foraging women were more likely to sing in large groups of less familiar individuals and less likely to sing in large groups of more familiar individuals. This supported for the coalition signalling hypothesis”. He further exclaims, “Formation of highly cooperative alliances is essential for the survival of the BaYaka who live in ever-changing precarious environments. They could especially help in tapping essential skills and knowledge of less familiar individuals. We think that in this way, music can act as an ice- breaker to gauge the skills or even encourage the enthusiasm of strangers as initiative is highly valued. Furthermore, trust is essential for this society to thrive as conflicts can occur between individuals co-residing in forest camps. We believe that in this way music can help in mitigating conflict and encouraging cooperation with individuals the focal individuals are socially less close to”.

### **Lack of evidence for the predation deterrence sub-hypothesis**

The study also hypothesized that singing in large numbers could have originated to deter predation as the foraging individuals are under potential risk from large animals like elephants, gorillas, and leopards. “However, we found no evidence for the predation deterrence hypothesis. This could be due to the possibility that the areas the women foraged in was already deprived of wild animals due to heavy bush meat trade”, Janmaat said. “Future studies should therefore study the BaYaka deeper in the forest, before these forests get emptied as well and we will never be able to investigate this potential function of the singing behaviour of foraging women”.

### **Possibility of touch playing a crucial role in infant-directed singing?**

Though the study does not make direct connections between singing and parent-infant bonds, it shows evidence that touch triggers singing. The researchers found that women were more likely to sing when they held infants of theirs or their relatives extensively. Several studies have discussed the role of parental singing in either increasing the bonds between parent-child contexts or increasing the attention of parents towards their children. The results of the study can be incorporated into the larger picture of parent-child interaction studies by emphasizing the importance of touch as part of a possible multimodal communication cannot be ignored. In other words, focusing only on singing or speech during parent-child interactions provide a partial picture of the grander studies on the origin of singing in such contexts.



**A child being held by the grandmother during a tuber digging event, while her mother is digging and singing in front of them (Courtesy: Karline Janmaat 2016).**

### **Music makes the forest happy**

“We know from their communication about music that the BaYaka sing to “please the forest”. They say: “a happy forest provides us with more food”. What the BaYaka dislike most is conflict, as they believe it would make the forest spirits angry. Our behavioural observations nicely complement their verbal communication and expression through music. The women sing more frequently when they search for food in groups that are large and contain fewer “friends”, in which conflicts about food are more likely to arise. To me, our study reveals that these foragers appear to use music as a tool to avoid potential future conflict. How amazing is that?!”, Janmaat says.





**A BaYaka group of women and kids singing and drumming with machette's and leaves, while resting during a hectic day's work in the forest (Courtesy:Karline Janmaat 2018).**



**Joy from the forest group excursions being brought and spread back in the camp, while carrying their collected food and firewood. The full fledged singing event is also accompanied by energetic drumming and percussion with pans and cups (Courtesy:Karline Janmaat 2016)**

“This study gives important empirical insights in the possible origins of music, a topic that for long had to be mere speculation”, says coauthor Henkjan Honing, professor of Music Cognition at UvA. “It made us decide to intensify our interdisciplinary collaboration and to further study the role of music with the BaYaka in a project aiming to unravel the human capacity for music. We are excited to announce our plans to return to this captivating society next year, where music appears to occupy a central role that transcends language.”

### **Publication details**

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*Disclaimer: Informed oral consent of the focal women and their families was obtained before the implementation of the study, allowing Karline Janmaat and Haneul Jang to follow the women during their daily foraging trips. In addition, prior oral and written consent was taken for pictures and video footage from the BaYaka. For further use of the pictures, permission has to be asked to Prof. Karline Janmaat, Dr Haneul Jang and Jorin Veen.*