

TRUNKS, TOLERANCE & TALKING

Exploring the Link Between Vocal Learning and Self-Domestication in ELEPHANTS

The relationship between **vocal learning** and **self-domestication** in elephants is an area of active research and is not yet fully understood. However, there is evidence to suggest that these **processes may be related** in some ways, and it potentially has implications for the **language evolution** of elephants. In this poster we will expand on these terms and how they are connected.

COMPLEX VOCAL LEARNING

Vocal learning is the ability to produce novel vocal signals through **imitation** or **modification** of **existing vocalisations** [1]. It allows for the acquisition and transmission of new vocalisations and the development of more complex communication systems.



The African Savanna elephant and the Asian elephant both are vocal learners [2].

They are very social and their intra-specific communication is highly developed. They can make **vocally inventive** sounds that are **socially irrelevant** [5]. This signifies that elephants produce a broad range of sounds with different communicative goals. Elephants can produce different sounds, such as:

- Trumpets
- Squeaks
- Roars
- Rumbling

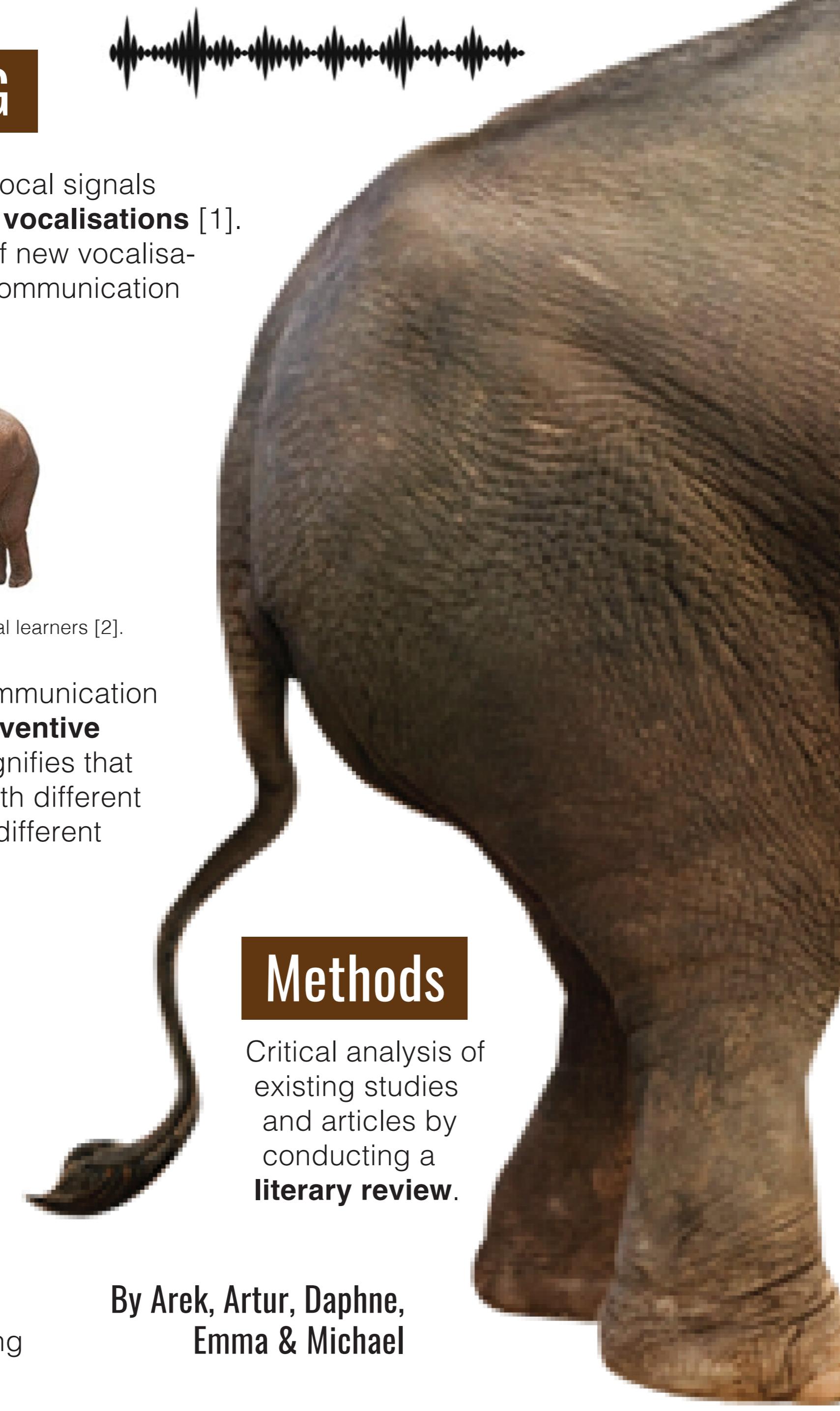
SELF-DOMESTICATION

It refers to the process by which a species undergoes **genetic changes** due to reduced natural selection pressure, resulting in **traits** that are commonly associated with **domesticated animals**. However, this occurs without the obvious presence of another species serving as a **domesticator** [4].

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RESEARCH QUESTION

What is the relationship between vocal learning and self-domestication in elephants?



Methods

Critical analysis of existing studies and articles by conducting a **literary review**.



Self-domestication relates to changes in brain neurotransmitter pathways associated with **aggression management**, and ultimately, with social behaviour [3].

Recent research suggests that elephants have also undergone this process. The **evolved factors** in elephants include:

- Sophisticated communication systems
 - Extended juvenile period
 - Prosociality
 - Alloparenting

Domestication is a multigenerational process spanning many consecutive events of **selective breeding** toward reduced aggression. This never occurred **systematically** in any elephant species by humans or **another species** [6].

THE CONNECTION

Elephants are an especially interesting case study for the relationship between vocal learning and self-domestication because, besides humans, they are the only species suggested to be **capable of both** [6].

Researchers suggest that both self-domestication and vocal learning are **important aspects** of **language evolution** [7][8]. This makes elephants a great example to further study the evolution of language in humans.

OTHER SPECIES

Elephants and **humans** are the only known species that perform complex vocal learning in a terrestrial environment [1].

Contrary to **birds** and **aquatic mammals** it is yet unclear how elephants' vocal processes connect to their cognitive and motor capabilities [9].

Bonobos are also considered self-domesticated, but are incapable of vocal learning. This is due to poor cortical-motor control of the larynx and vocal tract [2].

One of a trait considered as a highly specialized evolutionary appendage is using **additional aid for producing certain sounds** [3]. That was documented in elephants (using trunks to produce high-pitched sounds and certain vowels) and **orangutans** (who use leaves and hands) [2].

From the **clade of Afrotheria**, only elephants have been reported to produce vocal responses to cues [5].

It is crucial to look at the relationship between vocal learning, self-domestication and language evolution through a comparative analysis of animal species, to identify answers regarding **behavioural expression**, **neuronal control** and **functional relevance**.

DISCUSSION

Through our research we realized that the relationship between vocal learning and self-domestication is **complex** and **not fully understood**. While these processes may be correlated in some cases, they can also occur independently, and there may be other factors that contribute to the evolution of vocal learning or self-domestication in different species. **Further research** is needed to fully understand the relationship between these processes in animals.