

The Neuroscience of Icaros
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Introduction

The term "Icaro" derives etymologically from the Quichua verb "ikaray," connoting the act of "*dispensing curative properties through smoke*" (Luna, 1992). In a broad ontological sense, Icaros are songs imbued with the purported property of mitigating physiological, affective, and spiritual afflictions. Icaros are designed to invoke the spirits of plants, engendering healing, safeguarding against evil influences, and, intriguingly, even inciting the attraction of romantic affinities. The intricate and multifaceted therapeutic potential of Icaros has fascinated researchers, scholars, and healing practitioners for hundreds of years. The creation and use of Icaros are inextricably intertwined with Amazonian shamanism, also commonly called ayahuasca shamanism. Furthermore, Icaros play a pivotal role in plant dietas, a therapeutic practice focusing on cultivating a heightened sense of interconnectedness and communicative resonance between humans and plants.

Research inquiries into the tradition of Icaros have predominantly gravitated toward spiritual protocols and their resultant impacts on the outcomes of shamanic rites. However, the positive implications of passive auditory reception and active vocalization of Icaros appear to transcend the exclusive purview of spiritual or ceremonial properties. This paper explores the empirical evidence from the multifaceted cognitive and neurophysiological advantages of engaging with Icaros.

Example of an Icaro

Here is an example of an Icaro sung by Don Miguel, a Shipibo shaman with whom I will be privileged to work this coming November in Peru.



<https://youtu.be/cmXs55cwa5o?si=6VCTnCxNWPVYdFEr>. Below are the translated lyrics invoking ancestors and spirits so that they can protect and heal the people present in an ayahuasca ceremony:

Nocon Shawan – Welcome / calling the ancestors
Nocon shawan caibobo // Welcome family from afar
Nonra mato jowe acai // Now the spirits welcome you
Neska neska shamankin // I call you to this healing place
Mato jowe acai // I call the spirits to heal you
Mato jowe ayunshon // With this prayer I will heal you
Mato ishon banonkin // Listen to this healing prayer
Neska neska ranike // My ancestors heal the sick
Non shawan anibo // I call my sickly family
Nomabo beashkin // Spirits of the plants shall come
Chiti chiti shamani // They all dance among us now
Raro raro shamani // With their joyous dance they heal
Non mato ishonon // To you all I give this prayer

The neuroscience of how music can heal

The power of music to alter our moods and provide health benefits in general is well documented. When I wrote the Serenity Code (2020) to explore self-love habits that can reset our autonomic nervous system and increase our neuroplasticity, I found impressive evidence that music can:

- Increase motivation and goal-directed behavior: Music can act as a rewarding stimulus, motivating us to learn and engage in goal-directed behavior. For example, listening to music while exercising can make the workout more enjoyable and help us to push ourselves harder. Music can also be used to create a more positive and motivating atmosphere in the workplace or at school.
- Activate our reward system: Music can activate the mesocorticolimbic system, a brain circuit involved in reward and pleasure. When we listen to music that we enjoy, it can cause the release of dopamine, norepinephrine, endorphins, and oxytocin. These neurotransmitters can produce feelings of pleasure, euphoria, and well-being.
- Reduce stress and arousal levels: Music can help to reduce stress and arousal levels. Listening to relaxing music can slow heart rate, lower blood pressure, and minimize muscle tension. Music can also be used to distract us from negative thoughts and feelings.
- Improve our immune system function: Music can help to improve immune system function. Studies have shown that listening to music can increase the production of natural killer cells, which are white blood cells that help to fight off infection. Music can also reduce stress hormone level.

In addition to these top health benefits, music has also been shown to be beneficial for a variety of other conditions, such as:

- Pain management
- Anxiety and depression
- Sleep disorders

- Autism spectrum disorder
- Alzheimer's disease
- Parkinson's disease

Therefore, music is a powerful modality to improve physical and mental health in general.

The health benefits attributed to the use of Icaros in ayahuasca ceremonies

Since the musical component of the practice of Icaros is critical to its overall effect, there are many ways in which Icaros may promote healing.

Unfortunately, separating the direct effect of using Icaros during any ceremony is difficult. However, participants in ayahuasca ceremonies with Icaros have reported that the songs helped them heal from specific physical conditions, such as chronic pain, autoimmune diseases, and cancer. For instance, Perkins et al. (2023) found that ayahuasca drinkers who participated in ceremonies during which Icaros reported significant improvements in their physical health, including reduced pain, improved sleep quality, and increased energy levels.

Meanwhile, Icaros are often sung in a specific language, such as Quechua, and they often contain unique **healing sound frequencies**. The frequencies of Icaros are not well-documented, but they typically fall in the range of 432 Hz to 528 Hz. These frequencies are believed to be particularly resonant with the human body and can be used to promote healing and well-being. Research from Nakajima and his colleagues demonstrates that sounds directly affect our autonomic nervous system. Specifically, high-frequency sound waves play a greater role in stress relief than low-frequency waves. When Icaros are sung, the healing frequencies can directly affect the body, where they can work to heal imbalances. Icaros can also be used to clear negative energy from the body and to promote spiritual growth.

In addition to their specific frequencies, Icaros are used to integrate the healing energy of specific plants with powerful medicinal properties, such as ayahuasca. As a result, the plants' spirits are believed to be transferred into the songs.

In summary, Icaros sound frequencies can have a variety of effects on the brain, including:

- Reducing stress
- Inducing altered states of consciousness
- Inducing a state of relaxation
- Enhancing emotions
- Altering the mood
- Facilitating self-reflection and insight
- Providing support and guidance
- Creating a sense of safety and comfort

Emotional and spiritual healing of Icaros

As noted earlier, the benefits of listening to Icaros appear to transcend the physical realm.

For instance, Icaros contribute to the critical goal of creating **a sacred space** where people can feel comfortable exploring their inner selves and facing their most profound challenges. The singers of Icaros use their voices to create a sense of harmony and balance, which can help people feel more grounded and centered.

Second, Icaros evoke **deep emotions**, such as sadness, anger, and even fear. By allowing people to experience these emotions in a safe and supportive environment, Icaros can help people process their emotions and move toward healing.

Finally, Icaros **connect people with their spiritual selves** and help them see themselves as part of a larger interconnected web of life or cosmos. This sense of interconnectedness help people feel more loved, supported, and accepted.

Indeed, Icaros are also believed to be effective for emotional healing. For example, Bustos (2008) found that people who participated in ayahuasca ceremonies with Icaros reported significant improvements in their emotional well-being, including reduced anxiety, depression, and anger. In addition, some people reported that Icaros helped them heal from specific emotional traumas, such as childhood abuse and neglect. Another participant claimed that Icaros helped her process the trauma of being raped and reclaim her self-power.

Meanwhile, Callicott (2013) states that Icaros are also effective for spiritual healing. Callicott argues that Icaros are a "form of inter-species communication" in which the apprentice intercepts and interprets the phytochemical signals inherent in plant communicative processes. Also, Smith and Macheski (2023) suggest that kené designs (figure 1), a traditional Shipibo art form often used in Icaros, can be seen as a visual representation of the healing power of Icaros.



Figure 1: Kene design

Clearly, participants in multiple ceremonies using Icaros have reported that Icaros helped them connect with their spiritual selves and find a deeper meaning in life.

Conclusion

Exploring the neuroscience of Icaros is a challenging topic because of the subjective nature of its effect on physical, emotional, and spiritual outcomes. While studying the musical component may offer some promising insights, research appears limited to the measurable and calming effect of high-frequency sound waves. Disentangling the precise contribution of Icaros from the holistic impact of ayahuasca ceremonies is likely to remain difficult. Clearly, neuroscientific investigations into the cerebral response from Icaros are lacking. This situation offers a promising avenue for advancing our comprehension of the mechanisms through which Icaros exert their therapeutic influence. By delving into the neurobiological underpinnings of Icaros' effects on the brain, we may continue to unlock novel insights that enhance our understanding of this traditional practice and facilitate its potential integration into alternative paradigms of healing ceremonies. Such research endeavors stand poised to shed light on the intricate interplay between Icaros, neural substrates, and the tapestry of healing experiences, thereby paving the way for innovative applications within neuroscience, therapy, and spiritual transformation.

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