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Phantom Frequencies: The Exploration of Pareidolia in Spirit Box Investigations

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Abstract

In ghost hunting, spirit boxes are used to communicate with spirits and understand hauntings. These devices scan AM/FM frequencies to produce fragmented sounds and white noise, which enthusiasts believe spirits can manipulate. This paper delves into the concept of pareidolia, the brain's tendency to find familiar patterns in random sounds and evaluates the reliability of spirit boxes. By comparing human perception and paranormal tools, this paper provides a balanced analysis of spirit boxes' trustworthiness in paranormal investigations.

Keywords: *Internet; Physics; Psychology; Pareidolia; Spirit Box; Ghosts*

Introduction

The fascination with the paranormal has prompted the exploration of various methods to communicate with spirits, rather than just detecting their presence. Spirit boxes, like the one shown in Figure 1, have garnered interest because they produce real-time audio, unlike electronic voice phenomena (EVP), which requires playback to hear ghostly voices [1]. The immediate feedback from spirit boxes is a significant reason for their growing popularity, as it offers a more interactive and dynamic experience compared to listening to recorded EVP sessions later. This paper aims to explore the science behind the spirit box using audio pareidolia (the brain is wired to find familiar sounds in random patterns) [2] to provide a balanced argument on the reliability of this device.



Figure 1 – An image of a spirit box which is used within paranormal investigations in an attempt to communicate with spirits [3].

Spirit boxes

Spirit boxes are AM (amplitude modulation)/FM (frequency modulation) [4] radios that have been modified to scan through different frequencies, producing a series of fragmented sound bites which are interspersed with white noise [1]. Usually, they scan within the 87 MHz to 108 MHz range for the FM band and 535 KHz and 1,605 KHz for the AM band [5], which aligns with the frequencies produced by electric currents oscillating in radio transmission antennas [10]. Electromagnetic waves are produced when free charges accelerate or when electrons bound to atoms and molecules make transitions to lower energy states [10]. Enthusiasts believe that ghosts can manipulate these sounds or use external energy sources such as electromagnetic energy which is produced by the spirit box to be able to communicate [1]. Another belief from this source is that the frequencies reached by the spirit box align with the wavelengths and vibrations of that in the spiritual realm, allowing for communication across different realms that aren't within the human hearing range [1]. However, the ability for spirits to manipulate electromagnetic waves has not been proven scientifically, therefore creating doubt around claims.

An incident which is believed to be compelling evidence of an encounter with spirits is the Pennhurst State School and Hospital incident in Pennsylvania,

US [6]. In a spirit box session within this location, investigators received coherent responses which were relevant to the questions asked. The investigators claimed to have received the name of a former patient and details of their life, which matched that former patient’s historical records. Hence highlighting the spirit box’s ability to connect with the spirit world. However, the switching between different frequencies opens the possibility for the argument that the spirit box can tune in to a random radio station, which could be a reasoning for some of the responses received from the device. This may occur because the rapid scanning through AM and FM frequencies can inadvertently pick up fragments of existing broadcasts.

Pareidolia and Research Findings

Pareidolia is the psychological tendency to find patterns where there are none, in this case it being auditory pareidolia [2]. Users of spirit boxes often perceive responses they expect to hear, as their desire for communication influences their interpretations. There is scientific evidence to show that individuals are likely to hear signals that aren’t there when listening to white noise, especially if they are given potential signals before the experiment [7]. It is observed at 11:00 in a YouTube video from TFIL [8] that there are different perceptions of a communication with the spirit box, hence creating an argument about its reliability.

File Number	Average Confidence Score	Correctly Detected %
1	2.231	69
2	3.385	38
3	4.385	31
4	3.538	38
5	4.538	31
6	8.462	100
7	2.923	62
8	2.846	38
9	4.538	23
10	3.769	31

Table 1 – A table showing how Subjects rated their confidence in perceiving tones in white noise and a control file with a 200 Hz tone. Identifying the type of signal after being shown examples [7].

This experiment states that none of the subjects identified every recording correctly, hence reporting phantom signals, as seen in table 1 [7]. With a further two experiments confirming that when presented with pure white noise and asked if they detected any signals, they reported phantom signals. With another experiment [9] finding that 36 % of participants reported presence of electronic voice phenomena when listening to a track of white and pink noise, hence showing that there is quite a high amount of people who will hear something whilst it is not present in the recording.

Exploring spirit boxes through audio pareidolia reveals an intriguing comparison between human perception and paranormal tools. While spirit boxes are recognised for real-time spirit communication, auditory pareidolia questions their reliability. Scientific studies show our brains recognise patterns in random noise, leading to phantom signals. This tendency is relevant in using spirit boxes, as users' expectations and desires can heavily influence sound interpretations.

Conclusion

In summary, spirit boxes have garnered interest for their purported ability to communicate with spirits by scanning through AM/FM frequencies, producing fragmented sounds and white noise. Enthusiasts believe that spirits can manipulate these sounds to convey messages. However, the scientific principle of auditory pareidolia — where the brain recognises familiar patterns in random sounds — casts doubt on the reliability of spirit boxes. Studies show that individuals often perceive signals in white noise, influenced by their expectations. Thus, while intriguing incidents such as those at Pennhurst State School and Hospital suggest potential encounters with spirits, the evidence may be biased by psychological factors and the randomness of radio frequencies.

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