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Assessing Electronic Voice Phenomena through Speech Science

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EASTERN KENTUCKY UNIVERSITY

Assessment of Electronic Voice Phenomena through Speech Science

Honors Thesis

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By

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Assessment of Electronic Voice Phenomena through Speech Science

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Abstract

Electronic Voice Phenomena (EVP) are unexplained voices captured on audio recording, allegedly paranormal in nature (Buckner & Buckner, 2012). Little research exists on listener's perception of EVPs to date. The field of speech science involves the study of the production, transmission, and perception of human speech. Many concrete elements from the study of speech science have the potential to be applied to the interpretation of EVP content. Several works of literature were reviewed to assess current EVP analysis practices Interviews were conducted with various paranormal investigation societies across the nation to gather information on the general practices involved in EVP collection, analysis, interpretation, and use. Responses collected through interviews with paranormal investigators suggests that the process of collecting and identifying an EVP is a thorough and systematic process, but the interpretation process is lacking. No societies report experience collaborating with a speech professional or utilizing speech analysis in order to assist in their interpretation. Research is warranted on listeners' perception of the smaller units and elements of speech and the reliability across listeners, as well as acoustical analysis of EVP speech content.

Keywords and phrases: Electronic Voice Phenomena, EVP, speech science, speech perception, paranormal investigation, speech-language pathology, EVP interpretation

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INTRODUCTION

Paranormal Investigation: Electronic Voice Phenomena

The science of paranormal investigation encompasses a variety of tools and technologies used to collect data in order to determine the paranormal nature of any given location. These technologies are capable of assessing electromagnetic fields, locating temperature changes, detecting motion and vibration, capturing sounds undetected by the human ear, and so on. The primary focus of this study is placed upon the voice-like noises caught on digital recording devices that are not

heard real time by the human ear. These noises are commonly known as Instrumental TransCommunication (ITC), which refers to the communication of alleged entities through electronic equipment (Buckner & Buckner, 2012). Electronic Voice Phenomena(EVP) are a form of ITC that includes any type of voice-like anomaly that holds no scientific explanation.

The anomalous concept known as Electronic Voice Phenomena originated in June of 1959 when Friedrich Jurgenson heard voice-like sounds on his recordings of bird songs (Buckner & Buckner, 2012. Jurgenson originally dismissed the voices as interceptions of radio broadcasts, until he interpreted the voices to be discussing the bird songs heard on the recordings. The inexplicable connection between the voices and the situational context led Jurgenson to continue investigating and attempting to capture more of these anomalous voices. Jurgenson produced several literary pieces reporting his findings, which in turn stimulated the interest of other scientists such as Dr. Konstantin Raudive. Research and use of digital recorders in attempt to collect EVPs have since expanded and progressed throughout the years, and are now a normal part of scientific practice in paranormal investigation (Enns, 2005). Countless paranormal societies across the nation and the world currently use digital recorders and other recording technologies to capture and examine EVPs in order to assess their relation to any given location of focus.

Considering paranormal entities possess no physiological mechanisms to produce speech as humans would, it has been theorized that these entities possess

the ability to manipulate energy to signify their presence. This is measured during investigation practices using electromagnetic field meters, infrared meters, and so on. These devices capture the drastic and unexplained changes in energy throughout the affected environment (Sacco, 2007). These theories have carried over into the rationale for Electronic Voice Phenomena. It has been proposed countless times that the paranormal entities heard on EVP recordings do so by manipulating the sound energy into a rough imitation of human speech as a form of communication. Considering the anomalous content has been identified for years as "speech," it would only make sense to assess it using speech science.

Speech Science

Speech science is known as the study of the production, transmission, and perception of human speech (Small, 2016). In layman's terms, speech science investigates how speech sounds are made using the anatomy and physiology of our speech mechanism, how those sounds are carried acoustically from the speaker to the listener, and how the listener hears and perceives those speech sounds. Studying and analyzing the production of speech is focused on how anatomical mechanisms of the lungs, larynx, nose, and mouth produce the different qualities that humans hear in each individual speech sound. Analyzing the transmission of speech involves analyzing the acoustics of each sound and their combinations.

At the base level, speech is made up of individual sounds, otherwise known as phonemes. Phonemes combine to build morphemes, individual units of meaning. Morphemes make up words which in turn make up phrases, and

sentences. Each individual phoneme possesses its own acoustic properties of intensity, duration, and frequency due to its different production through the manipulation and interaction of the vocal folds and oral/nasal cavities. There is also prosodic, or suprasegmental, elements involved in speech. These features go above and beyond the boundaries of individual speech sounds and impact the listener's perception of an utterance. These elements include stress, tempo, and intonation. The combination of all three throughout a spoken utterance influence how listeners perceive intended meaning and emotion in that spoken message.

As noted, researchers have theorized explanations for the production of voice-like anomalies and their capture onto digital recorders, but there are currently no scientific means to test and analyze any of those given theories (Buckner & Buckner, 2012). However, the application of speech science can open the gate to a new evidence-based practice of EVP interpretation and assessment. The field of speech science is objective and heavily evidenced-based, while the interpretation of Electronic Voice Phenomena is a subjective and abstract practice with minimal concrete research. There is heavy research on human speech production and perception, but currently little to no research is being conducted in order to assess the role that speech science plays in paranormal investigators' interpretations of these voice-like anomalies. Applying the knowledge of speech can drastically improve the process of EVP interpretation and its reliability.

REVIEW OF LITERATURE

EVPs as Communication Attempts: The Debate

The Electronic Voice Phenomena movement began with Friedrich Jurgenson upon his discovery of voices on his recordings in 1957 and again in 1959. Jurgenson shifted from his artistic career to an investigative approach to understanding the origin of the voices. He publicized several works reporting his findings, ultimately sparking the continuing era of EVP research (Buckner & Buckner, 2012. Dr. Konstantin Raudive built upon the foundation laid by Jurgenson, leading the widespread activity of research on the phenomenon. Following his review of Jurgenson's literary pieces, Dr. Raudive's interest was piqued, and continued upon Jurgenson's research of EVPs and published findings of his own (Banks, 2001). Aforementioned, EVPs have now become a routine practice of paranormal investigation. Societies, such as American Association of Paranormal Investigation, Connecticut Ghost Investigations, Last Gasps Paranormal, and numerous others report regular use of digital recorders during investigations in an attempt to capture EVPs.

Countless works exist in support of EVPs as communication attempts by paranormal entities, but there are equally as many critique pieces serving to discredit the existence of paranormal communication. Approximately half of Americans reported some sort of belief in the existence of ghosts (Eaton, 2015. However, the paranormal realm encompasses not only ghosts, but also "individuals from another time or realm, extraterrestrial beings (i.e., aliens), or even ethereal beings," otherwise known as angels and demons (Buckner & Buckner, 2012, p. 46). Regardless of the nature of the entity whose communication is in question, the

debate falters equally between evidence suggesting the ability of paranormal

beings to manipulate energy within digital recordings to produce the simulation of

human speech (Bocuzzi & Beischel, 2011; Butler, 2007a; Butler, 2007b; Eaton, 2015;

Enns, 2005) and evidence for the support of psychological phenomena held

responsible for the interpretation of meaningless noise (Banks, 2001, Buckner &

Buckner 2012, Faulkner, Rosen, & Green 2012).

Critics in the argument against the legitimacy of EVPs as communication

attempts from a paranormal realm pose several theories regarding the

psychological phenomena that may play a role in how listeners perceive EVP

content as spoken language. The first theory to consider is apophenia, or

patternicity, which refers to the tendency of the brain to perceive meaningful

patterns out of something meaningless. This theory suggests that the brain cannot

process meaningless information, and therefore transforms it into a pattern that

makes sense (Buckner & Buckner 2012). In regards to EVP interpretation,

proponents of this theory suggest that rather than there being speech content on

EVPs, it is simply static noise that the brain automatically attempts to put into a

message that makes sense to it- speech. Though the theory relates to how the

brain may be interpreting a noise pattern into speech, the argument places no

regard for assessing how the brain perceives and categorizes the sound present on

EVP recordings. A second theory used as an argument against EVPs is priming.

Priming is the influence of one stimulus on the response of a second stimulus.

When applied to EVP interpretation, critics suggest that the priming caused by

investigator expectations influences their auditory perception, and ultimately, they hear what they want to hear within a recording. Research in regards to the concept of priming has shown that the context and expectation of the listener can influence perceptions of ambiguous (unclear) auditory stimuli (Nees & Phillips, 2015), a phenomenon known as pareidolia. Many pieces have been written suggesting the role that these phenomena play in the listeners' perception of EVPs, but none actually address the relationship between perception and the alleged speech content (Butler, 2007). It is perfectly acceptable to propose and test the psychological aspects of EVP interpretation, but until these concepts can be combined with aspects of the listeners' perception of speech content within EVPs, no progress will be made in regards to validating or discrediting EVPs as containing speech content.

Though usually indistinct and unclear, Electronic Voice Phenomena are hauntingly convincing when heard even by the untrained ear. Many experienced investigators provide their own arguments in support of Electronic Voice Phenomena as legitimate communication attempts from the paranormal. Utterances in EVP recordings are often one to two seconds long, with a smooth rather than abrupt initiation and termination suggesting a similarity between the recorded content and human speech (Butler, 2002). Data show that EVPs are most often recorded in the language of the investigator, often appropriate to the circumstance, and can be identified as the voices of deceased loved ones (Butler,

2002). Listeners frequently report the ability to identify the anomalous voice as male or female, and adult or child (Butler, 2007).

Many critics dismiss the content of EVPs as environmental noise. Freidrich Jurgenson himself initially dismissed the voice-like sounds found on his recordings as radio interception caught on the recorder, until he listened closer and heard the voices to be discussing the bird songs that he recorded (Buckner & Buckner 2012). However, experiments have been conducted in radio-frequency and noise cancellation chambers to assess the possibility of EVP capture. Several experiments in these conditions have taken place and have still allowed for EVP capture, debunking the arguments of EVPs being radio interception or environmental noise (Butler, 2007). Despite the arguments placed in favor if EVPs being legitimate communication attempts, none of these proponents have considered the aspect of vocal quality and presence of speech content in their research. In order to truly validate the presence of spoken communication of any given recording, the speech should be analyzed based on the units of language being used and heard.

Current Research on EVP Assessment and Interpretation

Again, though the aforementioned concepts provide substantial arguments for the advocacy of EVPs as legitimate, none directly address the actual components of the content found on the recordings. Substantial research exists on how components of linguistic and nonlinguistic indexical information influence a listeners' perception of recorded human speech, but little research exists to assess the listeners' perception of EVPs. Only two studies have been conducted aimed at

assessing the listener's perception of words within pre-selected EVPs. The first study, known as "The Listening Experiment," was designed by Tom Butler (2007) to assess the reliability of listeners' ability to identify individual words within those EVPs. Butler argued that if the proposed psychological phenomena were true, then it would be impossible for listeners to agree upon words in selected EVPs. He tests this theory by playing five class A EVP samples for participants who were simply asked to write the words they heard. The responses of all participants were compared against a pre-determined interpretation of the selected EVPs. The respondents averaged at hearing 32% of the words correctly, the highest amount correct being 100% across 3 of the listeners. Participants who had identified themselves as "skeptics" averaged at 24% of words correct, while those who had identified themselves as "believers/supporters" averaged 34% correct words. Butler suggests that though the average was low, there was certainly still a degree of consistency and reliability across listeners. Additionally, seeing as "almost-right" answers were not considered, the reliability could potentially be higher if listeners perception of individual speech sounds had been taken into consideration.

In the winter of 2013, Dr. Mark Leary took note of the problem with EVP interpretation and analysis, the same problem addressed in this paper, and set out to assess it. He developed a large-scale study involving 94 EVPs, designed to document the degree to which investigators agree or disagree on their interpretations of EVPs, and to develop a means to identify the most "correct" possible interpretation of any given EVP. Dr. Leary recruited 24 individuals with

paranormal investigation experience (10 male, 14 female) to listen and interpret the 94 preselected EVPs. The 94 EVPs were selected based on degree of clarity from a collection of 250 total submissions. The participants were permitted to listen to the EVPs as many times as needed and were instructed to write each word they could hear, leaving an asterisk for those they could not. The participants were also asked to identify any emotions that they could detect in the recordings.

Dr. Leary used the participant interpretation submissions to determine the degree of agreement across listeners. He states:

> Analysis of raters' interpretations was based on the assumption that a particular interpretation of an EVP that is made independently by several people is more likely to be 'correct' than an interpretation that is made by only a few individuals. (Leary, 2013, p 1)

He developed a "consensus interpretation" in which each word was selected based on which word was selected most by participants. If 17 out of the 24 participants identified the first word to be "go," that word was selected based on majority consensus. Once interpretation of each EVP was derived from consensus, Dr. Leary calculated a percentage of the listeners that agreed with the whole interpretation. The highest agreement was at 83% for an EVP suspected to say "What's going on" based on the consensus interpretation. The average for all 94 EVPs in total was at 21% agreement. When agreement was analyzed at the word level rather than the message as a whole, agreement was at 35% across listeners. Dr. Leary proposes that using this method of consensus interpretation would provide investigators with a

more precise system of identifying EVP clarity, but provides no input on the use of perceiving speech in EVPs.

Dr. Leary included a portion in his study aimed at assessing the listener's ability to perceive emotions within the "spoken" content. Listeners were simply asked to indicate what emotion they could detect in the recording, if any. 63.5% of the EVPs were identified with "no discernable tone." Sadness was detected in 9.7%, anger/irritability in 8.2%, urgency in 7.7%, and happiness in 6.3%. Dr. Leary suggested listeners' personality characteristics may have been influential in their perception of emotions in the recordings. He noted those who measured as extroverts on their background submission more frequently reported emotions of "happiness" in the EVP recordings. Those who scored higher on agreeableness reported both "happiness" and "anger" more often. Those who scored higher on emotional stability also frequently detected "happiness."

Dr. Leary concluded from his study that rater accuracy had no relationship with the degree of involvement in paranormal investigations, years of experience, personality dimensions, age, or beliefs in the paranormal. He concluded that investigators should hold some degree of disbelief in their interpretations in EVPs seeing as an average of only 22% of interpretations were shared across listeners. He offered four recommendations for future practices of EVP interpretation. His first recommendation is that investigators should not conclude the interpretation of any given EVP for other listeners without soliciting their independent interpretations. The second: if the content of a given EVP is particularly important

(e.g., potential message from a deceased family member), then the investigators should use a smaller scale version of his procedure to determine a blind consensus interpretation of the message, and report it only if the majority of listeners derive the same/similar interpretations. Dr. Leary's third suggestion is that investigators should refrain from concluding interpretations from unclear EVPs, considering doing so would be misleading. His fourth and final recommendation is that investigators put in place formal guidelines for the interpretation of EVP recordings that minimize the potential for providing misleading interpretations to other individuals or the public.

In the spring of 2013, Dr. Leary decided to conduct an extension study to his previous research. This second study was conducted to assess EVPs that were collected using radio-sweep rather than a general digital recorder. The radio-sweep device rapidly scans through radio channels to allow for any paranormal entity to manipulate theambient sound to produce words. Dr. Leary wanted to assess whether or not the low-agreement rate found in the prior study would also be found with EVPs collected using the radio-sweep technology. A second goal of the second study was to assess how one's interpretation was affected by knowing what other individuals heard. This concept reflects back to the aforementioned priming phenomena. Dr. Leary wanted to test the degree to which priming might play a role in listener's biases.

For this extension study, 12 EVPs were selected from a total of 19 submissions. The EVPs ranged from one syllable to 11 syllables. Dr. Leary collected

the independent interpretations of two secondary paranormal investigators in addition to the original sender's interpretations of the EVP submissions in order to assess which investigator participants would agree with the most. The secondary investigators' interpretations only matched the original interpretation by 11.5%. A total of 90 participants were involved in the study. This time, there were three different experimental groups. The first received no interpretation of the EVPs before listening. The second group received the original investigator's interpretation prior to listening and interpreting their own. The third group received the secondary investigators' interpretation prior to listening. Each group was permitted to listen to the 12 clips through headphones as many times as needed to write their own interpretations.

When matching participants' interpretations to the original and secondary investigators' interpretations, leniency was provided for word identification independent of word placement, as well as singular/plurals, contractions, and homonyms. The group that did not see any prior interpretations matched words of the original interpretation at 6% and words of the secondary interpretations at 8%. Only one interpretation out of this group matched the original's interpretation completely. The group that saw the original interpretation matched at 23% of the words, and the group that saw the secondary interpretations matched those at 27% of the words. The jump in accuracy between the group that received no priming versus those that did suggests that priming certainly plays an influential role in how one might perceive an EVP message.

Though Dr. Leary's studies do not investigate into the actual nature of Electronic Voice Phenomena and the legitimacy of speech being present, they certainly question the degree to which EVP interpretation is valid and reliable. There was no doubt that EVPs are a task to interpret and consistency amongst listeners varies, but the studies conducted by Tom Butler (2007) and Dr. Leary (2013) direct our attention to how unreliable EVP interpretation truly is based off of simple listening tasks. Even the experienced investigators' interpretations only matched the original investigator's interpretation on 11.5% of words, thus debunking theories that paranormal investigation experience improves EVP interpretation. As brought to our attention through Dr. Leary's original study, interpretations of EVPs should be considered very cautiously when interpretations are important to the nature of an investigation, due to their ambiguity.

Speech Science: Factors to be applied to EVPs

There are many elements of speech science that have the potential to be applied and used in the interpretation process of Electronic Voice Phenomena. Analysis of human speech and the qualities of its individual parts is a highly systematic process, and has the potential to be utilized in some fashion during the analysis of EVPs. Consider: broken down to its simplest level, speech is made up of speech sounds, known as phonemes. Phonemes are combined to create units of meaning, which are known as morphemes. Those morphemes then build to form words, and words are combined to create meaningful phrases and sentences. Each individual phoneme possesses its own qualities of production such as how and

where they are produced in the oral and nasal cavity. Alternating movements between the vocal folds, tongue, lips, and soft palate are what create the distinctly different sounds in spoken language (Small, 2016).

Each phoneme also possesses its own acoustic qualities, referring to the intensity, duration, and frequency of each sound. Intensity is referred to as "the amplitude or magnitude of the energy of a produced sound," (Small, 2016, p. 174), typically measured in decibels (dB). Loudness is the direct perceptual correlate of intensity. For example, the phoneme /b/ as in "bat" is produced with greater intensity than the phoneme /p/ as in "pair." The result is the perception of /b/ being louder than /p/. Duration refers to the time in which it takes to complete a production of a given speech sound, typically measured in milliseconds (ms). The phoneme /s/ as in "Sam" is produced with a longer duration than the phoneme /t/ as in "top." The /s/ is perceived as longer while the /t/ is perceived as a quick, short sound. Individual phonemes also have their own frequency, measured in Hertz (Hz). Frequency is defined as "the number of cycles a vibrating body completes in 1 second." (Small, 2016, p. 173). Pitch is the direct perceptual correlate of frequency. For example, the phoneme /ʃ/ ("sh" as in "shut") is produced with a higher frequency than /m/ as in "map" and ultimately can be perceived as having a higher pitch.

The distinctive qualities of each phoneme are ultimately what allow humans to differentiate one sound from another when listening to a spoken message. Humans do not perceive speech in individual units (i.e., phonemes), but

rather the combinations and overall intended meaning. Human brains are capable of automatically and subconsciously interpreting each sound based on the combinations in which they are placed (Meyers-Schulz, Pujara, Wolf, & Koenigs, 2013). However, one minor change in the production of a phoneme can change the meaning of a word as a whole. For example, the word "pat" can change to "bat" simply by the vibration of the vocal folds during production the first letter. The sounds /p/ and /b/ are produced with the exact same placement of the articulators, but /p/ is produced with no vocal fold vibration, while /b/ is. This concept reinforces the importance of each individual phoneme used to convey meaning in a given spoken utterance.

In addition to the distinctive production and perceptual qualities of each individual speech sound, there is also nonlinguistic indexical information imbedded in spoken language (Mullennix, Bihon, Bricklemyer, Gaston, & Keener 2002). This is also known as prosody or suprasegmentals. As stated before, suprasegmental elements ascend above and beyond the actual spoken content. These elements impact the way a message is delivered verbally and how the listener perceives and mentally stores those messages (Mullennix et al. 2002). Again, these suprasegmental elements are known as stress, timing, and intonation.

Monosyllabic words, or words with only one syllable, are always produced with stress. Multisyllabic words on the other hand, always possess one syllable that is produced with more stress than the other syllable or syllables. The stressed syllable is louder, longer in duration, and higher pitched than the rest of the

syllables in the word. Depending on where stress is placed, it has the potential to change the meaning of a word, playing a large role in how spoken language is interpreted. For example, consider the word "content." When stress is placed on the first syllable ('content), the word is perceived to mean topics or matter, such as "the *'content* of the book." However, when the stress is moved to the second syllable (con'tent), the word to mean satisfaction is perceived (e.g., "She is *con'tent* with her life").

Additionally, stress can be focused on one word in a sentence, which has potential to change the meaning of any sentence as a whole. For example, consider the sentence, "I want iced coffee." If emphasis is placed on the word 'iced', the sentence is heard as "I want 'ICED' coffee," which indicates the speaker is highlighting the fact that he wants the iced coffee and not a hot coffee. If stress is placed on the word 'coffee,' it is heard as "I want iced 'COFFEE'" which indicates that the speaker is highlighting the fact that he desires a coffee and not another drink such as a tea.

The tempo and timing of an utterance refers to the rate of speech, which plays a subtle role in how a message is conveyed. Tempo and timing are used to show a hesitation, indicate the presence of a new thought, emphasize a single point, or more importantly, to contrast two or more points. Timing and tempo are also important to the fluent production and perception of speech. This suprasegmental element allows us to produce speech in an intelligent and elegant manner, rather than sounding robotic.

Intonation, the third primary suprasegmental element, is the modification of the pitch of the speaker's voice to cue the listener into the type of utterance that is being spoken, whether it is a question, an exclamation, or a statement. Intonation is also an incredibly important factor in conveying emotion. It can help convey a message of excitement, sadness, indifference, and so on. Falling intonation occurs when the pitch of the speaker's voice declines towards the end of an utterance. This often signals that the utterance was a statement or a command. It is also indicative of any sort of Wh-questions. These are all the questions that begin with "who", "what", "when" "why", "which", "how", and "where." Rising intonation occurs when the pitch rises towards the end of the utterance. This most often occurs with yes/no questions and also lists. Again, intonation allows speakers to produce a message in a systematic manner rather than sounding monotone and programmed.

REVIEWING CURRENT EVP PRACTICES

It has been brought to light through Butler (2007) and Leary (2013) that Electronic Voice Phenomena cannot be concretely interpreted based on current listening practices. EVPs are the brunt of a large debate between skeptics and believers, but minimal research is being conducted to assist in further validating or discrediting the "speech" content heard on EVP recordings. Interviews were conducted to assess the degree to which EVPs are utilized in current paranormal investigation practices, and how they are currently being analyzed and interpreted. Determining the current practices of EVP use in paranormal investigation may

guide further research in reconciling the interpretation struggle through use of a more evidence-based, speech-science practice.

It was determined that information on EVP collection and analysis should be gathered through first-hand experience rather than second-hand source. An online directory found at paranormalsocieties.com exists providing information on paranormal societies across the nation. The directory provides a list of societies by their state of origin. For each society, details are provided including team name, number of members, specialties, details, and contact information. At least one paranormal society was selected from each state along with additional societies at random. A total of 70 societies from across the nation were contacted via the email they listed on the directory. The initial email invited the societies to participate in an interview that would provide their use of EVPs in their own investigations. Those who responded with interest were provided with a list of questions via email. These questions were designed to collect first-hand experience knowledge on EVP collection and interpretation in a typical paranormal investigation process.

The questions targeted our ability to collect information on typical processes and methods involved in EVP capture, such as the technologies used, the amount of time spent recording, and the methods investigators used to allow opportunities for EVP capture. Theprocess and methods involved in identifying and EVP were inquired upon:, referring to how an EVP is identified and chosen out of an expanse of recordings. The most important questions referred to process and methods for interpreting the messages in suspected EVPs. In other words,

information was gathered on the current systematic practices involved in decoding the spoken message in the identified EVPs. The investigators were also asked to identify if they are able to detect emotion in any of the EVPs they have personally captured. They were also asked the degree to which they have collaborated with any speech science professional, speech-language pathologist, or utilized any speech analysis software to assist in EVP interpretation. Knowledge of these current practices will guide future research on improving investigators ability to interpret EVPs in a more systematic fashion. The questions were designed for responses on an open-ended basis, with flexibility to provide as much or as little information as they desired.

Processes and Methods involved in EVP Capture

A total of 24 societies out of the 70 contacted submitted completed questionnaires. Only one out of the 24 responded with short, simple worded responses, and even skipped a few answers. The remaining 23 provided sufficiently detailed responses for each of the questions. Information from the 23 remaining groups were included in the collection of responses. Digital recorders are used as common practice in paranormal investigation in attempt to capture EVPs. However, most investigative equipment, such as video recorders, also possess microphones that are capable of capturing these unexplained vocal anomalies. In regards to methods used in EVP capture, 100% of respondents reported using digital recorders throughout the entire length of investigations. On average, investigators report keeping 2 recorders on hand at all times, some carrying up to

3. Though a variety of digital recorder models were reported for investigation use, the most common brands are consistently Sony and Olympus. Reports show the societies keep several recorders running throughout an entire investigation process, while additional recorders are used for shorter sessions in individual locations of the investigation site. Several investigators reported that they consistently mark any extra noise by verbally announcing their occurrence. These noises may be caused by the investigators (e.g., sneeze, opening a creaky door, squeaky floorboards), or environmental noise (e.g., car driving by, dog barking). The purpose of verbally marking extra noise during the recording is to avoid mistaking those noises as paranormal during the playback sessions.

Each of the societies reported using a combination of three methodologies in attempt to allow for EVP capture. The names used for each method vary for each society, but the concept remains the same throughout each report. The first method is called the "static/lock-off" or "passive" method. This is the simplest of all three styles, and is commonly used throughout all investigations. Using this method, investigators place recorders throughout an investigation site and leave them to record continuously, unimpeded by the investigators. These are often left for hours and, in some cases, days.

The second method is called the "challenge/response" or "active inquiry." The active inquiry method is the most popular method to use throughout investigations, for it provides potential entities some form of stimuli to elicit a response. This method involves asking and presenting entities a series of related

questions or comments in hope to receive a response in form of EVP capture.

Investigators always verbalize at full volume during these sessions rather than

whispering, in order to assist in discriminating between the investigators voice and

any potential EVPs during playback sessions (Chianese, 2017). Following each

verbalized question or comment, investigators leave about 15 to 30 seconds of

silence to allow for EVP capture. The goal of the questions asked during these

sessions is to gather as much information about the entity as possible. These may

include questions about their name, age, history, and so on. Cobb (2017) also

suggests that when utilizing this method, investigators use their knowledge of the

location's history to guide their questioning. He also suggests that questions are

short, and there are substantial pauses provided between each question.

    The third and least preferred method utilized in attempt to capture EVPs

can be called the "antagonist" or "active aggressive" method. This can also be

referred to as "taunting" or "provoking." Investigators typically only use this style

of method when all other attempts are yielding little to no results. The provocative

questioning is intended to "annoy" any entities into responding (Strom-Mackey,

2017). Many of the societies who participated in the interview process did not

include use of this style in any of their reports, rather they stick to the passive and

active inquiry methods. Some investigators actually consider that antagonizing any

present spirits may cause them to ignore the investigator and lead to less potential

EVP capture (Cobb, 2017; Raines 2017). Cobb (2017) also provides

recommendations to maximize capture during the active aggressive and

antagonistic methods, similar to the active inquiry method: use historical

knowledge of the location, be direct, and maintain a calm but demanding tone.

Processes and methods involved in EVP Identification

To gain insight into the prominence of EVP capture and use across all types

of paranormal investigations, the investigators were asked to approximate the

percentage of their investigations that have resulted in successful EVP capture.

The lowest reported incidence of EVP capture was at 3% whereas the highest

reported incidence of capture was at 60%. The average percentage of EVP capture

across investigations from all of the societies is 26.6%, meaning approximately 1

out of every 4 investigations results in EVP capture of some kind.

There is no doubt that EVPs are a task to identify. Investigators report a

range of investigations lasting anywhere from 4 to 12 hours, or potentially a few

days in serious cases. This means there is always at least 4 hours of continuous

recordings to listen through, in addition to extra sessions conducted with

additional recorders throughout the investigations. EVP identification requires

intent listening and consumes a considerable amount of time. All of the

investigators reported similar processes of EVP identification upon audio review.

The condensed information is as follows: First, digital recordings are uploaded to a

PC or laptop that possess an audio viewing and editing software of some sort.

Based on the reports, various different audio software is used by different teams,

but all allow for basic editing purposes. Once the recording is uploaded,

investigators or tech members listen to the recording in its entirety through headphones. All potential EVPs are marked throughout the recording.

Once the full listening is complete, all of the suspected EVP sections are clipped out in sections of about 30 seconds or more. The suspected EVP is then isolated, and then copied behind the original 30 second clip. The isolation is then copied an additional time, and amplified by approximately 25-50% Doing so allows for the EVP to come through at a louder volume. The amplified version is then copied again, and the speed is reduced by 25-50%. No societies reported any additional alteration or editing techniques outside of basic amplification and slowing of speed to enhance the intelligibility of the recording. Many report that additional edits lead to a distortion of sound, and ultimately less reliable interpretations. Strom-Mackey (2017) suggests that any clip of audio that is too indistinct to interpret through basic amplification procedures should be considered "invalid" and be "scrapped."

The resulting clips are classified into 3 different groups based on clarity. The first classification is class A. These EVPs are the clearest out of all 3 classifications. The words in class A EVPs are considered easy to understand and almost always agreed upon. These recordings can actually be heard through an open speaker rather than just headphones. EVPs with this degree of clarity are rare to come by and are considered most valuable for evidence of paranormal activity. The second classification, B, is the most common out of identifiable EVPs. Class B recordings are less clear than class A, but they still contain some degree of

intelligibility. Some of the words in class B recordings are commonly disagreed upon, but the general interpretation remains the same. These recordings generally require use of headphones in order to hear as clear as possible. The third classification, C, is the least clear out of all styles. Recordings are placed in the C category if there is almost no way to decipher the words within the message. These recordings are incredibly difficult to understand, and headphones are certainly needed in order to hear the EVP itself. Most investigators suggest spending time on A and B classifications. Class C recordings are often discarded due to lack of clarity.

Processes and Methods for EVP Interpretation

Each society was also asked about the procedures they regularly use to interpret EVP messages. This aspect of information is key in building a foundation for future research on the implementation of a speech science-based interpretation methodology. The majority of societies report using a blind listening technique to gather all team members' interpretation of the EVP. Meaning, each team member listens and interprets the message independently, in order to avoid influencing one another's perceptions. In many cases, listeners will disagree as to whether or not the recording truly is an EVP. When team members are unable to provide a consensus agreement on the presence of a vocal anomaly, the EVP is disregarded and no longer used as valid (Raines, 2017). When societies were asked if they utilize any strategies such as breaking the recording down into its smaller units of speech, all but one stated that they did not. All of these societies stated in some

fashion that they interpret the message as a whole. The one society that stated differently, simply addressed that they interpret word-by-word, making no comment on addressing the perception of smaller units of sound for each word. EVP interpretation across various groups is ultimately a guessing game with no systematic process. EVPs are loosely interpreted by team members, and the result is then voted upon. Most societies will discard any EVP that is not voted unanimously as valid by all team members. Some only require a majority vote in order to keep a recording as evidence.

Contextual and Emotional Relevance of EVPs

Each society was asked if they have received any EVPs that appear to match the context of the situation during the recording. The majority responded using the terms, "sometimes" and "it depends." Raines (2017) reports there tends to be an even mixture of nonsensical and practical answers in response to active inquiry/challenge-response sessions. Meaning, sometimes the recordings seem to certain logical responses to contextual stimuli, while others are completely unrelated. Weidner (2017) reports that approximately 75%+ of recordings collected throughout his society's investigations match the context to some degree. He states the EVP selection process is very thorough, and only keeps clear EVPs as legitimate. This may contribute to the high incidence of matching responses. Cobb (2017) states that a large portion of recordings he has collected relate to the environment or history of the location under investigation. Often times, he finds EVP recordings are not necessarily answers or responses to direct

questions or comments, but rather interjections into passive conversations between the investigators.

In addition to the questions asked regarding how often EVPs match the context of the situation during time of recording, investigators were also asked how frequently they are able to derive emotion from EVPs they have gathered. Again, responses frequently revolved around the concept of "sometimes." It was stated repeatedly that the short length of EVP recordings makes it difficult to detect any emotional qualities. EVPs that capture screams or calls for help yield an emotional reaction of fear or urgency. Cobb (2017) suggests that detected emotions are more so related to the content of the message rather than how they are produced. He uses "get out" as an example of two short words whose use can yield an emotion such as anger, not because of how it is pronounced, but rather the semantic meaning of that two-word combination. Excitement, confusion, fear, anger, and frustration were commonly detected emotions reported across societies. The average percentage of EVPs that possess detectable emotional intonation was reported between 10-20% (Poppendorf, Fits, & Howell, 2017; Strom-Mackey, 2017).

Assisting Professionals

Societies were asked about their experience working with professionals outside of their field. Many reported collaboration with historians, psychologists, psychiatrists, medical professionals, and most commonly, psychics. They were also directly asked if any had collaborated with a speech-language pathologist or

speech scientist to assist in EVP interpretation. None of the societies reported any

past collaboration with speech professionals of any kind outside of translators. A

few responded with comments claiming that they had never thought to do so, and

thought that they would certainly be willing to bring a speech professional in to

assist in their interpretations. One society member stated that they have access to

"speech pathology software" that can be used to analyze speech patterns, but made

no comment on the degree to which they are able to use that software in their

interpretation process. Raines (2017) made a statement saying it is often difficult to

receive assistance from professionals outside of the paranormal field due to fear of

ridicule.

DISCUSSION

Substantial research exists in favor and in opposition of Electronic Voice

Phenomena as legitimate communication attempts from a paranormal realm.

These researchers pose various questions and arguments aimed at assessing the

true potential for paranormal entities to present themselves in a scientific matter

through audio recordings. Content from both sides of the debate are scientific in

nature, but also leave a significant amount of untested theories. Various

psychological theories are suggested to play a role in the listeners' perception of

spoken language in EVP recordings, while experienced investigators pose

arguments in favor of audible speech within recordings. Though the arguments

placed across the current debate of EVP legitimacy are necessary and important,

conclusions from existing research suggest that minimal focus has been placed on

the interpretation and perception process of EVPs. Considering the alleged speech content heard on EVPs is the focal point of their collection, it has been suggested that further research be conducted on listeners' perceptions and interpretations of this anomaly. Interviews were conducted with experienced paranormal investigation societies to gather foundational information on common practices for EVP collection, interpretation, and use in order to guide the path for additional research

Responses from the interview process strongly suggest that the general practice of EVP collection and selection is an incredibly concrete and thorough process. All societies presented with systematic experience in their use of digital recorders in an attempt to capture anomalous voices. In fact, research shows that EVP capture nearly doubles when a systematic challenge/response method is used comparative to other styles (Butler, 2007), suggesting there is a rhyme and reason to the skills investigators use in attempt to capture EVPs. The selection process of EVPs was typically reported in a step-by-step manner in which investigators listened carefully and systematically in order to identify and isolate potential EVPs out of extended amounts of audio recording. However, reports on the investigators' process for interpretation of the speech within EVP recordings were lacking. All were unable to provide any form of guidelines that assisted them in interpretation outside of guessing. All stated that they attempted to interpret each individual word or the message as a whole.

It was also made evident that utilizing assistance from a speech professional was never a concept that had been brought to the table for paranormal investigators. Many of the investigators involved in the interview process were piqued by the suggestion of utilizing a speech scientist or speech-language pathologist as a tool in EVP interpretation. Many other professionals have been involved in paranormal investigation, but none directly related to the EVP interpretation process outside of language translation. Investigators' experiences also suggested that the verbal content of EVPs can frequently relate back to the context of the given time of recording. However, outside of the verbal content of EVPs, emotional inflection is difficult to hear and identify due to the short length of capture.

The content of this literature review is foundational in nature. The purpose of the interviews was to gather insight on current practices utilized during EVP collection and interpretation in order to assess the degree to which speech sciences of any kind were being used as an analysis tool. The primary limitation to the reports on current practices was the miniscule representation of paranormal investigation societies from across the nation. Several hundred societies are identified and listed from all 50 states. However, only 24 participated in the interview process. Gathering more information from additional societies would increase the validity of the information obtained.

CONCLUSIONS

The basic foundational information gathered through the interview process suggests that utilizing speech science in the analysis of Electronic Voice Phenomena is a nonexistent practice. Collection processes are thorough, but the analysis and interpretation processes are lacking. Incorporating the systematic use of speech science may lead to a more valid and reliable process of EVP interpretation in future practice. Additional research is warranted in order to assess listeners' perceptions of the smaller units of speech within the words captured on audio. These units may include phonemes (individual speech sounds) and syllables. The degree of reliability across various listeners is necessary in determining listeners' abilities to accurately and repeatedly perceive the same/similar phonemes as other listeners.

It should also be considered how prosody can be detected in EVP message, and if present, what role it plays on a listener's perception of the message meaning and its potential emotional contexts. Additional acoustical analysis can and should be conducted to make comparisons between the alleged speech in EVP recordings and the acoustical readings of human speech sounds. Electronic Voice Phenomena have been known as anomalous voices found on recordings for approximately 50 years to date. It is time to address the validity of those voices based upon the concepts known throughout speech science. Doing so could greatly enhance the assessment practices used to analyze EVP content.

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