

Brain Signature Profiling

Using **B.E.O.S.**



Brain Electrical Oscillation Signature profiling

Number of Suspects
screened by Court
order

Numbers

*Directorate of Forensic Sciences
Gandhinagar, India*

Cases tested : **234**
People tested : **287**

Cases tested : **54**
People tested : **116**

Approx Totals

Cases : **288**
People : **403**

As of 2014
2015 - 2018

*Directorate of Forensic Sciences
Mumbai, India*

Cases tested : **104**
People tested : **167**

Cases tested : **20**
People tested : **35**

Approx Totals

Cases : **124**
People : **202**

Total

Cases: **412**
People: **605**



DIRECTORATE OF FORENSIC SCIENCE
Gujarat State, Sector - 18 A, Gandhinagar

DFS/BEOS/info/
Date: 08/07/2014

2876

14

To,
The Director,
Axxonet System Technologies P. Ltd.,
85/13, 14th cross, Bhavani Layout,
Christ School Rd., Nr. Sagar Motors,
Off Bannerghatta Rd.
Bangalore - 560029

Sub: Providing data for compilation of statistics of BEOS usage

Ref: Your letter dated 17/6/2014

Dear Sir,

With reference to above, the information sought by you for compilation of statistics of BEOS usage is furnished in the below table


1	Total number of cases since last 10 years	224
2	Total exhibits examined	264

The above data is from the year 2005 till date, and the service supplier gave satisfactory service during the AMC tenure
Thanking you,

Yours sincerely

A. D. Shukla
(A. D. Shukla)
Assistant Director
Forensic Psychology Division
Directorate of Forensic Science
Gujarat State, Gandhinagar

(सिफ-एच. वी. प्र. ३) (SpL.F.S.L.-3)

	<p>महाराष्ट्र राज्य फॉरेन्सिक साइन्स लॅबोरेटरीज DIRECTORATE OF FORENSIC SCIENCE LABORATORIES पुणे विभाग, महाराष्ट्र राज्य, HOME DEPARTMENT, MAHARASHTRA STATE दुबई : ०२-२६७०७५५/५८ कार : क्रिमिनॉलॉजिस्ट Tel. : 022-26670755/58 Telegram: CRIMINALISTICS</p>	<p>विभागणी, हास भुग्न मार्ग VCHHAGAR, HAS BHUGRA MARG संतारुज (पूर्व) SANTARUJ (EAST) मुंबई - ४०० ०१८</p>
	<p>क्रमांक (No.): MC/37/1844/14 Date: 21 JUNE 2014</p>	

To,
The Director,
Axxonet System Technologies,
85/13, 4th Cross, Bhavani Layout,
Bangalore-560029,

Subject: Information on the usage of NSS- BEOS technology in Psychology division,
DFSL, Mumbai.

Reference: Your letter dated 17th June, 2014.

Sir,

With reference to the above letter this is to inform you that Psychology division, DFSL, Mumbai has reported till to date **One Hundred and Four (104) Cases** and **One Hundred Sixty Seven (167) Subjects** using NSS - BEOS technology in our **Two (2) BEOS labs**.

(R. R. MAVLE)
(R. R. MAVLE)
Assistant Director
Forensic Science Laboratory,
Home Dept., Govt. of Maharashtra, Mumbai.

BEOS

in the Press

Gauri Lankesh murder accused agrees to undergo lie detector test

Police said the suspected illegal gunrunner had played only a minor role in the murder.

Updated: Mar 12, 2018 21:49 IST

Vikram Gopal
Hindustan Times, Bengaluru



People hold placards and candles during a vigil for Gauri Lankesh, a senior Indian journalist who according to police was shot dead outside her home on Tuesday by unidentified assailants in Bengaluru, in Ahmedabad on September 6, 2017. (Reuters File Photo)

The only person arrested so far in journalist **Gauri Lankesh's murder** case agreed in court on Monday to undergo a lie detector test.

The accused, KT Naveen Kumar, a **suspected illegal gunrunner**, had earlier declined to take the test, said an officer on the special investigation team (SIT) probing the case. The officer

Mar
2018



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The accused, KT Naveen Kumar, a **suspected illegal gunrunner**, had earlier declined to take the test, said an officer on the special investigation team (SIT) probing the case. The officer, who declined to be named, said Kumar played only a minor role in the murder, but did not share details.

After questioning Kumar following his arrest on February 18, investigators revised the number of suspects in the case from three to four.

The third additional chief metropolitan magistrate's court sent Kumar to judicial custody till March 26.

The SIT officer said Kumar also agreed to undergo brain electrical oscillation signature profiling, a forensic investigation technique that is also referred to as brain fingerprinting.

"This test is conducted only in Ahmedabad. Once we get a date from them, we will seek the court's permission to take him there," said the officer.

The Telegraph

Thursday, March 15, 2018

Mar
2018

Home > Jharkhand

April date for lie test

Our Correspondent | Mar 14, 2018 00:00 IST



Jamshedpur: Gandhinagar forensic science laboratory (FSL) has given city police time in the first week of April for the brain mapping and narco analysis of the three accused in the sensational rape case of a minor in Mango. Having got a tentative date, police have started compiling a report based on the findings of the investigations so far.

"As soon as we get a specific date for the tests, we will start preparations for taking the three accused, Indrapal Singh Saini, Shiv Kumar Mahto and Srikant, to Gujarat," SSP Anoop Birthray said. The trio, presently lodged in Ghaghidih Central Jail, had recently agreed to undergo the lie tests at the court of first additional district judge Ashok Kumar.

Although police have made considerable progress in the case from the call details records (CDRs) and mobile tower locations of the accused, the SSP refused to reveal anything. "The CDRs and mobile tower locations have given us several leads. But I will reveal everything after the probe is complete which includes the results of brain mapping and narco analysis," the SSP said.

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Mumbai: All five suspects are undergoing the lie-detector test in Arpita murder case

— By Diwakar Sharma | Jan 04, 2018 07:52 am

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After conducting their polygraphic tests, the suspects' Brain Electrical Oscillation Signature (BEOS) profiling will be conducted at FSL Kalina. BEOS is a scientific tool which is used to identify individuals with experience of participating in a crime. And the last resort for investigators will be to conduct a narco-analysis test of suspects. Though these reports will not be admissible in the court, the FSL official added, "These reports will help investigators solve the murder case."

The Tribune

Posted at: Dec 7, 2017, 12:35 AM; last updated: Dec 7, 2017, 12:35 AM (IST)

Police brutalities, false confessions in CBI chargesheet

10
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A file photo of protesters setting the police station on fire at Kotkhai.

Bhanu P Lohumi
Tribune News Service
Shimla, December 6

The CBI chargesheet in the Kotkhai custodial death case is a narrative of how innocent persons, exposing their black face.

With no physical, technical, forensic, circumstantial and confessional evidence against the five accused arrested in the Kotkhai minor rape and murder case, the third degree torture of the accused to extract confessions to support the claims made by IG ZH Zaidi during a press conference on July 13 led to custodial death of Suraj.

The confessional statement of Deepak alias Deepu, extracted to implicate the four others, Rajender, Suraj, Subhash and Lokjan, was made the focal point but when confronted with other four accused, none of them admitted to the crime.

As per the CBI chargesheet in the custodial death of Suraj, the eight police officials not only fabricated the evidence and registered a false case against Rajender for killing Suraj in the police lockup at Kotkhai on the night of July 18, but also destroyed evidence and made false entries in the records.

The polygraph, narco and **brain**-mapping test, conducted at the Directorate of Forensic Science, Gandhinagar, supported the versions of the accused that they were innocent and tortured to support the police version.

During the narco test, Rajinder alias Raju revealed that one day when Suraj requested for one more chapatti, police personnel got upset and took him upstairs, this was the last time he saw Suraj. Even Subhash said although he passed by the scene of crime, he did not see the body. During the **Brain** Electrical Oscillation Signature Profiling test conducted on Lokjan, it was revealed that he was at his sister's home at the time of the Kotkhai minor rape and murder incident which supported his statement.

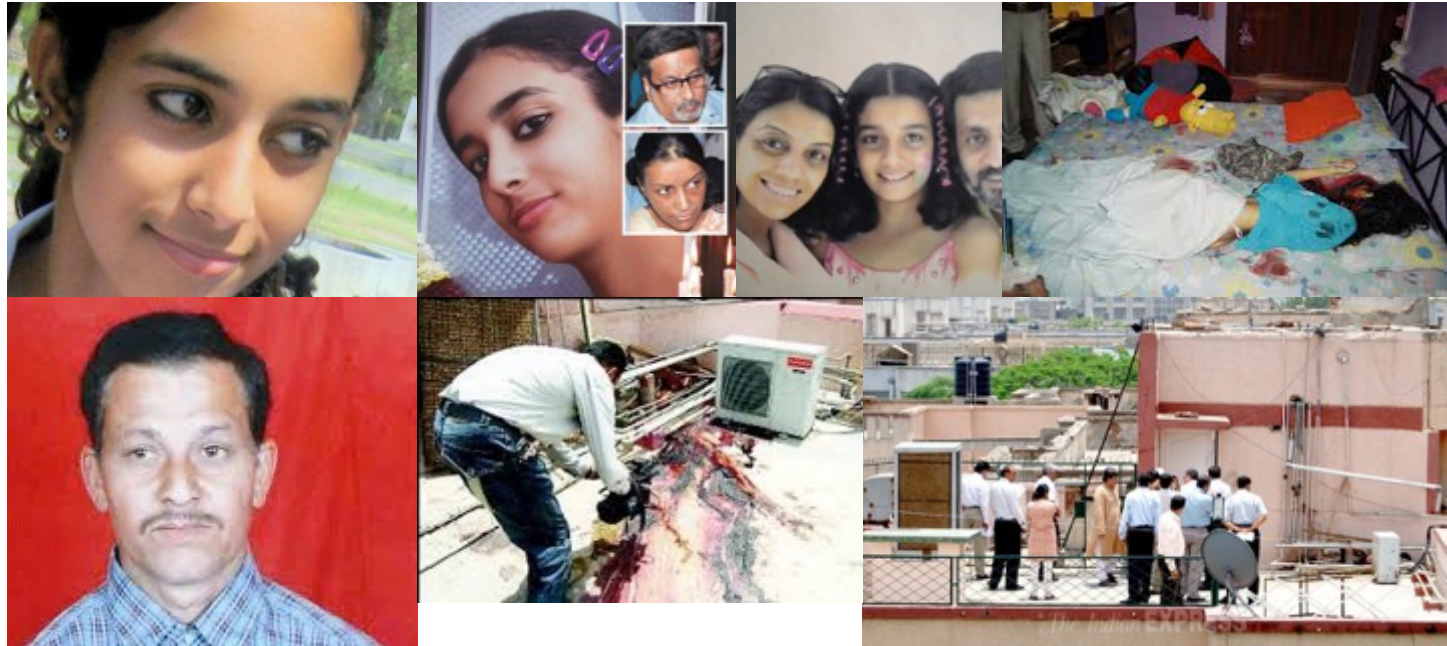
May 16 2008

Oct
2017

Aarushi Talwar found dead in her bedroom (age 14)

Hemraj the help was found dead on the terrace after 2 days

Hemraj was the initial suspect



Oct 14 2017 : The Times of India (Mumbai)

'Crime scene didn't exist in minds of Talwars'

Parth Shastri

Ahmedabad:

When the Central Bureau of Investigation (CBI) was probing the murders of Aarushi and Hemraj, it brought Rajesh Talwar, Nupur Talwar, and Rajkumar -the domestic help of Talwars' friend --to the Directorate of Forensic Sciences (DFS), Gandhinagar, in 2009. The three underwent narcoanalysis, psychological profiling, polygraph examination, and BEOS (brain fingerprinting).

Dr S L Vaya, an additional director at the DFS at the time, led the team that conducted the tests. She submitted her report to the CBI. As no signs of deception were found during BEOS, narcoanalysis was conducted on the Talwars. None of the tests gave any indication of their involvement. Based on the findings, a different line of investigation focusing on the domestic help was suggested. The report, however, was never presented to the trial court and thus has not been cited in the recent high court judgment either.

When the Central Bureau of Investigation (CBI) was probing the murders of Aarushi and Hemraj, it brought Rajesh Talwar, Nupur Talwar, and Rajkumar -the domestic help of Talwars' friend --to the Directorate of Forensic Sciences (DFS), Gandhinagar, in 2009. The three underwent narcoanalysis, psychological profiling, polygraph examination, and BEOS (brain fingerprinting).

Oct
2017

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The report, however, was never presented to the trial court and thus has not been cited in the recent high court judgment either.

The Tribune

Thursday, March 15, 2018

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Published: Mar 13, 2017, 1:39 AM; last updated: Mar 13, 2017, 1:39 AM (IST)

Shimla lab to have brain-mapping facility

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Bhanu P Lohumi
Tribune News Service
Shimla, March 12

The state government has decided to equip the State Forensic Science Laboratory (SFL), Junga, with the brain-mapping facility.

"Himachal will be the second state after Gujarat to have the facility and the test will cost Rs 55,000 plus 15 per cent service tax," said Director, SFL, Arun Sharma, adding that the facility was started in Karnataka and Maharashtra, but discontinued.

"Brain mapping, also known as brain electrical oscillation signature profiling or brain fingerprinting, is a computer-based technology to identify criminals by scientifically measuring the brain waves to crime pictures, sounds and relevant words," said Sharma.

It is a test that maps the brain to reveal 'guilty knowledge' and done to interpret the behavior of a suspect and corroborate the investigating officers' observation and the suspect's statements. During the tests, forensic experts apply unique technologies to find out if the suspect's brain recognises things from the crime scene that an innocent suspect would have no knowledge of.

Mar
2017

indianexpress.com/article/cities/delhi/delhis-new-ashok-nagar-rape-case-dna-brain-mapping-test-of-accused-4479294/

Reader

The Indian EXPRESS

Delhi's New Ashok Nagar rape case: DNA, brain mapping test of accused

Police said investigators had preserved the minor girl's clothes.

By: **Express News Service** | New Delhi | Published: January 18, 2017 2:11 am

To make a watertight case against the accused Sunil Rastogi, who was arrested last week for allegedly raping two girls in New Ashok Nagar, Delhi Police ~~are planning to~~ conduct DNA and brain mapping tests on him.

DCP (east district) Omvir Singh said the accused was arrested for allegedly raping two minors and molesting another in New Ashok Nagar. "After sustained interrogation, the accused told the police about his involvement in various other cases in the area of New Ashok Nagar, Ghaziabad, and Rudrapur in Uttarakhand. We are now building evidence against him," he added.

Jan
2017

Blind murder mystery solved after ten years

Bhilai, Nov 25:

'Brain Mapping Test' of the suspects revealed the missing links of a blind murder mystery and helped the investigating police to solve the case after about ten years. Raipur based builder Rajendra Nigam was murdered at Kumbhari on January 21, 2007. Nigam based renowned astrologist Dinesh Srivastava son of Late Shanti Swaroop Srivastava; and two others Deepak Pandharkar son of Shiv Narayan of Chagorabhata Raipur and Rakesh Jha of Raipur have been arrested in connection to this murder. Property and business disputes were the cause of murder.

Addressing media persons here at Police Control Room on Friday, IGP Deepanshu Kabra informed that body of Raipur based builder Rajendra Nigam was found in a car at Kumbhari on January 21, 2007. Initially the case appeared to be suicide but on the basis of PM report and FSL findings, Police registered a homicide case on April 15, 2008.

Police launched its investigations and interrogated the people those who had family or business relations with the

deceased. Nigam had some business dealings with Dinesh Kumar Srivastava of Indravati Nagar, Raipur. During interrogation, Dinesh stated that he was at home on the day of incident but his mobile phone location did not confirm his statement. Some other people were included in the list of suspects which include J

Ritesh Naidu of Durg and Anwar Dhebar of Bayron Bazar Raipur as they had some business dealings with the deceased. One Pappu Khan of Maudhapara worked as part time driver for Nigam. He was also included in the list of suspects.

All the suspects were separately interrogated but any

significant clue was not discovered. Taking the matter into serious cognizance, police filed an application before the court seeking Brain Mapping and Narco Analysis of the suspects Dinesh Srivastava, J Ritesh Naidu, Pappu alias Taj Khan and Anwar Dhebar. Dinesh Srivastava refused for this test while the others ac-

cepted to undergo.

Some other suspects were discovered in the brain mapping test and those people were also thoroughly interrogated. The new suspect Deepak Pandarkar of Chagorabhata informed that he had met Dinesh Srivastava in the year 2001. Dinesh was involved in property dealing

and had some disputes over some deals with Rajendra Nigam. Dinesh had to pay about Rs 32 lakhs to Nigam against some deal. Two other suspects Deepak and Rakesh Jha had some business dealings with Dinesh Srivastava and they were unable to pay debts to Dinesh. The three were thoroughly interrogated

and they confessed to have murdered Rajendra Nigam.

Unable to pay debts, the accused spun a conspiracy to kill Rajendra Nigam. As per the plan, they called Nigam for some religious rituals and pooja at Mauli Mata Mandir on January 20, 2007. Rakesh Jha was sent as part time driver for Rajendra Nigam. He drove Nigam's car and took him to Mauli Mata Mandir. They met Dinesh and Deepak at the temple and then they proceeded towards Khamhariya for performing some other rituals. Dinesh and Deepak moved on their bike while Rakesh and Rajendra followed them in the car. At a lonely place in Khamhariya, Deepak handed over a pistol to Rakesh, but he failed in firing a shot. Rajendra realized that there was something wrong and he immediately occupied the driving seat. Before he could have escaped, Deepak shot a bullet on Rajendra's head. Nigam died on the spot. The accused trio left all evidences which could prove it to be a suicide case. They left the pistol on the body and later sent SMS from Nigam's mobile to his family stating that he is committing suicide.

Brain Mapping provided missing links of the conspiracy



Dimapur Police SIT cracks Ritika Mehta murder case

June 14, 2016



Files charge sheet against four persons, including two from GPRN/NSCN

DIMAPUR, JUNE 13 (MExN): The Special Investigation Team (SIT) of Dimapur Police investigating into the murder of Ritika Mehta, proprietor of the Apna Hotel has arrested four persons, including a woman in connection to the crime and has filed charges against them.

A prominent businesswoman, late Ritika Mehta was shot dead after miscreants fired at her inside her establishment on December 14, 2015.

A press statement from Additional Deputy Commissioner of Police and PRO, Dimapur Police said the four accused, who were arrested on different occasions, include Motsuthung Ngullie, a resident of Boro Lingri and established to be 'tatar' of Lotha region, GPRN/NSCN; Thungkhomo Jungio, reportedly a 'deputy kilonser' under GPRN/NSCN, Tiachungba Ao, the stepbrother of the victim and one Thechano Ngullie.

incident, the SIT was formed to investigate into the aspects related to the case and the perpetrators behind the crime. The SIT was able to gather necessary evidences against the accused persons in the form of physical, documentary and digital evidences. The investigation was also assisted by the Forensic reports in the form of Narco Analysis Test and Brain Electrical Oscillation Signature profiling (BEOSP) conducted upon two accused – Motsuthung Ngullie and Thungkhomo Jungio from the Directorate of Forensic Sciences, Gandhinagar, the Dimapur Police press release said.



Ahmednagar Dalit killings: Cops arrest family member who filed complaint, parents claim foul play

By: **Express News Service** | Pune | Updated: December 4, 2014 9:11 pm

Police have arrested the complainant in the case of brutal murder of three members of a dalit family.



THE Police have arrested none other than the complainant in the case of the sensational murder of three persons from a Dalit family in Javkhed Khalsa village in the Ahmednagar district of Maharashtra in October this year.

Inspector General of Police Pravin Salunke today confirmed the arrest of Prashant Dilip

Police said that the case was sensitive and arrest was made only after proper evidence was obtained against the suspect Prashant Jadhav. Inspector General of Police Salunke said that arrest was made following crucial evidence obtained from brain mapping and forensic tests. Police had conducted tests on six persons including Jadhav and other family members of the deceased.

Aug 25 2014 : The Times of India (Ahmedabad)

Five of a family acquitted in woman burning case

Vadodara:
TIMES NEWS NETWORK

3 Had Requested Brain Mapping To Prove Their Innocence

Six years after they were arrested for killing a married woman by setting her ablaze, five members of a family were acquitted by a local court recently .

On October 9, 2008, Nazeer Vohra had registered a complaint against his brothers Inayat and Riyaaaz and their wives Ameena and Shaahen and his sister Reshma. Nazeer had alleged that the five came to his house in Jarod village in Waghodiya taluka and set his wife Razia on fire early in the morning. Razia had died 20 days after the incident and named the five persons in her dying declaration.

However, additional sessions judge AK Gupta acquitted all five on the grounds that the evidence produced by the prosecution was doubtful.



The five accused, who were arrested on charge of murder, were acquitted by a Vadodara court

What set this case apart was that the three of the accused had requested for their **brain** mapping at Forensic Science Laboratory (FSL), Gandhinagar to prove their innocence.

"It is probably for the first time in Gujarat that three persons accused of murder had made such a request. The complainant, Nazeer Vohra had opposed the accused's application for **brain** mapping but the Gujarat high court gave permission following which the procedure was done earlier this year," said advocate, Rajendra Trivedi.

8/17/2015

After four years in jail, Malegaon accused get bail

THE HINDU

Nov
2011

NATIONAL

Mumbai, November 5, 2011

After four years in jail, Malegaon accused get bail

• Staff Reporter



"The process of granting justice has started, but it is not complete. It will be complete when they are declared innocent by the court. The local police had changed the direction of investigation. Even the ATS kept arresting people. It filed false charge sheet and the CBI toed that line of investigation. The accused willingly consented to the brain mapping and lie detection tests. They said they were willing to undergo even the narco-analysis test. We are thankful to the NIA that they did not oppose the bail," advocate Jaleel Ahmed, who is also the brother of an accused Abrar Ahmed, told The Hindu.

**GERMAN'S RAPE CASE: BRAIN MAPPING TESTS ON VAINGANKAR**

Panaji: A local court has allowed brain mapping and lie detector tests on the prime accused in the Rodrigues case.

Judicial Magistrate First Class (JMFC), Edgar Fernandes, allowed the Goa police to subject Sandeep Vaingankar to these psychological tests. The test would be conducted at Forensic Laboratory at Santa Cruz in suburban Mumbai, police sources said.

Rodrigues, a social activist and lawyer of the German lady who has accused state Education Minister Atanasio Monserratte's son Rohit and Public Works Department (PWD) minister Churchill Alemao's nephew Warren of sexually exploiting her daughter, was assaulted on October 13.



Research & Papers

Review of
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& TOXICOLOGY**

Including Clinical & Pathological Aspects

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Gautam Biswas

**2nd
Edition**



Forewords
Joseph A Prahlow
Anil Aggrawal

JAYPEE

- **Brain Signature Profiling** (BSP) or BEOS is another EEG procedure which was developed in 2003 by CR Mukundan which is similar to **brain** fingerprinting.
- In the case mentioned above, the woman was convicted of murdering her former fiancé based on BEOS profile. But subsequently, the Mumbai High Court suspended her sentence and released her on bail due to a lack of sufficient evidence.



Brain Electrical Oscillation Signature Profiling (BEOS)

Vishal Kumar Parmar (Institute of Behavioral Science, Gujarat Forensic Sciences University, Ahmedabad, India) and C. R. Mukundan (Axxonet Brain Research Laboratory, Axxonet System Technology, Bangalore, India)

Source Title: [International Journal of Computers in Clinical Practice \(IJCCP\)](#) 2(1)

Copyright: © 2017 | Pages: 24

DOI: 10.4018/IJCCP.2017010101

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Abstract

This article shows the development of techniques for deception detection has reached a stage of extreme complexity as the information sought must be extracted from the brain of suspects, instead of making inferences about it from the emotional effects produced during the traditional lie detection tests. This includes the presentation of concealed information and oral or behavioral responses by the individual are necessary requirements for use of these techniques. The new technique described here extracts information directly from memory, without having the individual respond to the statements - probes presented. It measures the components of electrical oscillations generated during remembrance of autobiographical episodes, which can occur only when one has acquired the experiences through participation in the said activities.



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Recommended Journals

Brain Electrical Oscillation Signature Profiling (BEOS) - Effective as an aid to investigation

International Conference on Forensic Research & Technology
October 15-17, 2012 DoubleTree by Hilton Chicago-Northshore, USA

Anjali Yadav and M.S. Dahiya

ScientificTracks Abstracts: J Forensic Res

DOI: 10.4172/2157-7145.S1.005

Abstract

A subject's involvement in a crime is expected to be either as a suspect, witness or a victim. It is to be kept in mind that if a suspect is involved in the crime, he/she may not reveal the facts because of the sanctions that would follow on being found guilty. To extract the real facts from the subject, we may employ tools that assist in ascertaining if the accused concerned is involved in crime or not. When there are no witnesses and no evidence is available, we can still hope to elicit relevant information related to the crime from a suspect by an acceptable scientific technique called Brain Electrical oscillation signature profiling (BEOS). It's a technique for extracting an Electrophysiological signature of an experience during its remembrance. In BEOS profiling the subject is presented with a probe, which contains references to the episode to be remembered. The electrical oscillations/ activity related to remembrance is called the 'Signature' of the experience. The awareness of the remembered episode is called 'Experiential Knowledge'. Thus it can be said that the test measures remembrance of the Experiential Knowledge. The results of BEOS are obtained in form of electrical activity from the brain related to probes. On the other hand, the test expects the subject to remain silent and only listen to a narrative presented as short verbal statements (probes) in sequence, subject need not give any oral response to the stimulus, but the brain waves indicate that the brain has some information in regard to these items.

Relevant Topics

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Document Preview

Paranormal movie based "experiential knowledge" using brain electrical oscillations signature (BEOS) profiling

Nandini, N; Kacker, Priyanka. *Indian Journal of Health and Wellbeing*; Hisar Vol. 8, Iss. 11, (Nov 2017): 1285-1290.

Indian Journal of Health and Well-being
2017, 8(11), 1285-1290
http://www.iahw.com/index.php/home/journal_detail/1991a

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UGC Approved and have NAAS Ratings

Paranormal movie based “experiential knowledge” using brain electrical oscillations signature (BEOS) profiling

Nandini N.
Gujarat Forensic Science University
Gandhinagar, Gujarat

Priyanka Kacker
Institute of Behavioral Science
Gujarat Forensic Science University, Gandhinagar, Gujarat

Brain Electrical Oscillations Signature Profiling (BEOS) for Measuring the Process of Remembrance

Mukundan CR*, Sumit S and Chetan SM

Axxonet Brain Research Laboratory, Axxonet System Technologies, Bangalore, India

***Corresponding Author:** Mukundan CR, Axxonet Brain Research Laboratory, Axxonet System Technologies, Bangalore, India.

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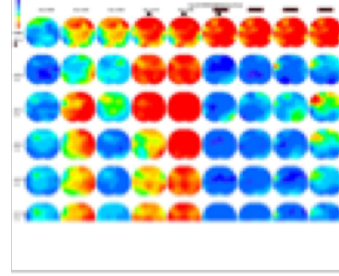
Abstract

The BEOS test was designed and developed as an alternative method to the use of polygraph based lie-detection test and test based on recognition measured by event related potential of P300. BEOS is a neurocognitive indicator of the presence of remembrance taking place in the brain, when the same is cued by probes referring to previous experiences. They are presented in a sequential manner to an individual, who sits silently with eyes closed, without having to give any response to the probes. There are several changes associated with remembrance that take place in the brain during retrieval and BEOS score of Experiential Knowledge (EK) is a reflection of several of them. Remembrance of a previously experienced activity may be automatically and mandatorily triggered by cues presented to a subject. It could occur only if one had either participated or witnessed an activity, which is different from knowing about the same activity from an external source. Remembrance may be blocked or lost because of debilitating states like repression or degenerative process of the brain, when the test cannot be administered. The procedure has gone through validation studies and has been since routinely and successfully used for facilitating forensic investigations. Several hundreds of cases have been successfully investigated using the procedure, which has helped to understand the specific roles played by participants in each episode. The system continuously records multi-channel electrophysiological activity (EEG) from the scalp of the subject and also presents the probes only when the subject is not engaged in any other mental-cognitive activity. The system carries out the analyses automatically and produces a final report of the findings. Details of multiple analyses used and issues of sensitivity and specificity of the technique are discussed in the article.

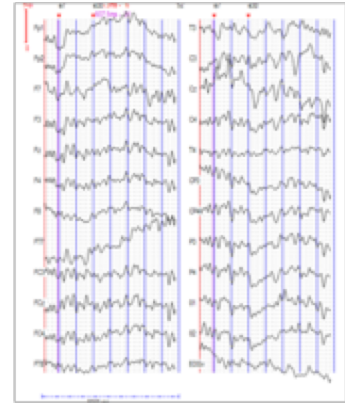
Keywords: *Remembrance; Autobiographic Episodes; Experiential Knowledge; Brain Electrical Oscillations; Frequency and Time Domain Analyses*

Technology

- **Non Invasive - does not violate any law or religious principles**
- Verify if a suspect is involved in a terrorist activity or crime
- Reads and analyses a Suspects ***brain oscillations - Remembrance***
- ***Suspect does not have to respond***
- Test takes 30 minutes to 1 hour to complete
- **High Accuracy automated Reporting**



B·E·O·S·



Other Techniques



3rd Degree

- Physical Harm to the suspect
- No way to verify the truth
- Human rights violation



Truth Serum

- Inject subject with chemicals
- Dangerous for suspect
- Been proved ineffective
- Easy to lie under influence of serum



Lie Detection

- Measures Heart rate, Breathing, Sweating
- Needs experienced operators
- Manual Analysis and reporting
- Easy to beat - antipolygraphy.org









P300

- Fake technology
- P300 brain wave occurs at 300 milliseconds
- Cannot be used to analyse memories
- Unproven (2 cases)

Involved

Sr.No.	Probes	P.ID	Signature
20	mi ani Santosh ne ayesha terrace var aet	ARA	Encoding -82-2-5
21	terrace var andhar hota	PSR	Experiential Knowledge III-64-4-8
22	terrace var khup adgal hoti	IIR	Primary Processing
23	Ayeshala gadbad aslyache janavle	TSR	Encoding
24	Tine palaniya cha prayatn kela	TAR	Experiential Knowledge III-64-4-8
25	Amhi tila pakdun thevlele	ARA	Experiential Knowledge III-45-6-9
26	Tine pratikar kela	TAR	Encoding III-45-6-9
27	Ti ordu lagli	TAR	Encoding
28	Amhi tiche tond dablela	ARA	Encoding -100-0-0
29	amhi tila panel javal nevun tila zopval	ARA	Primary Processing
30	tichi chaddi kadhli	ARA	Encoding -82-2-5
31	Santosh tiche tond dharun hota	TAR	Experiential Knowledge III-55-5-9
32	mi mazi pant kadhli	ARA	Encoding III-73-3-7
33	mi tichyavarjabardasti kamya cha prayatn	ARA	Primary Processing
34	Ti khup ghabrali hoti	TSR	Primary Processing
35	Ayesha khup radat hoti	TAR	Primary Processing
36	ti khup pratikar karat hoti	PSR	Encoding
37	santoshne hi tichyavar jabardasti keli	PVR	Encoding III-9-10-3
38	Nantar aamhi ghabarilo	PSR	Encoding -100-0-0
39	Koni pahil asa vatla	PSR	Encoding

Not Involved

Sr.No.	Probes	P.ID	Signature
"SCENARIO 3 - LAST SIGHT OF NEERAJ BHADANA"			
1	I was in room No.327	AR	Inattention
2	I was with Versha	AR	Primary Processing
3	We were studying in room No.327	AR	Experiential Knowledge III-6-16-6
4	At about 6.45pm, Neeraj came to the room	AR	Encoding -88-2-6
5	She entered through Versha-s room	AR	Encoding -75-4-10
6	She went to her room No.526	AR	Encoding
7	She went to her room through balcony	AR	Primary Processing
8	 came back to our room after a while	AR	Encoding III-50-8-13
9	 was carrying 2 books	AR	Primary Processing
10	 kept books and her mobile in Versha's room	AR	Encoding -81-3-8
11	 again left the room	AR	Primary Processing
12	 went towards balcony	AR	Encoding
13	 started studying.	AR	Encoding -94-1-3
14	I left Versha-s room talking over the phone	AR	Encoding -94-1-3
15	At around 8pm, I saw Neeraj standing outside	AR	Encoding III-31-21-22
16	On asking the reason, Neeraj said she was	AR	Encoding
17	She was going for biometric signature	AR	Primary Processing
18	and to pay Sonu bhaiya.	AR	Encoding
19	I dont know how Neeraj came back to her	AR	Encoding -75-4-10

EXPERIENTIAL KNOWLEDGE

Acquired through participation/execution

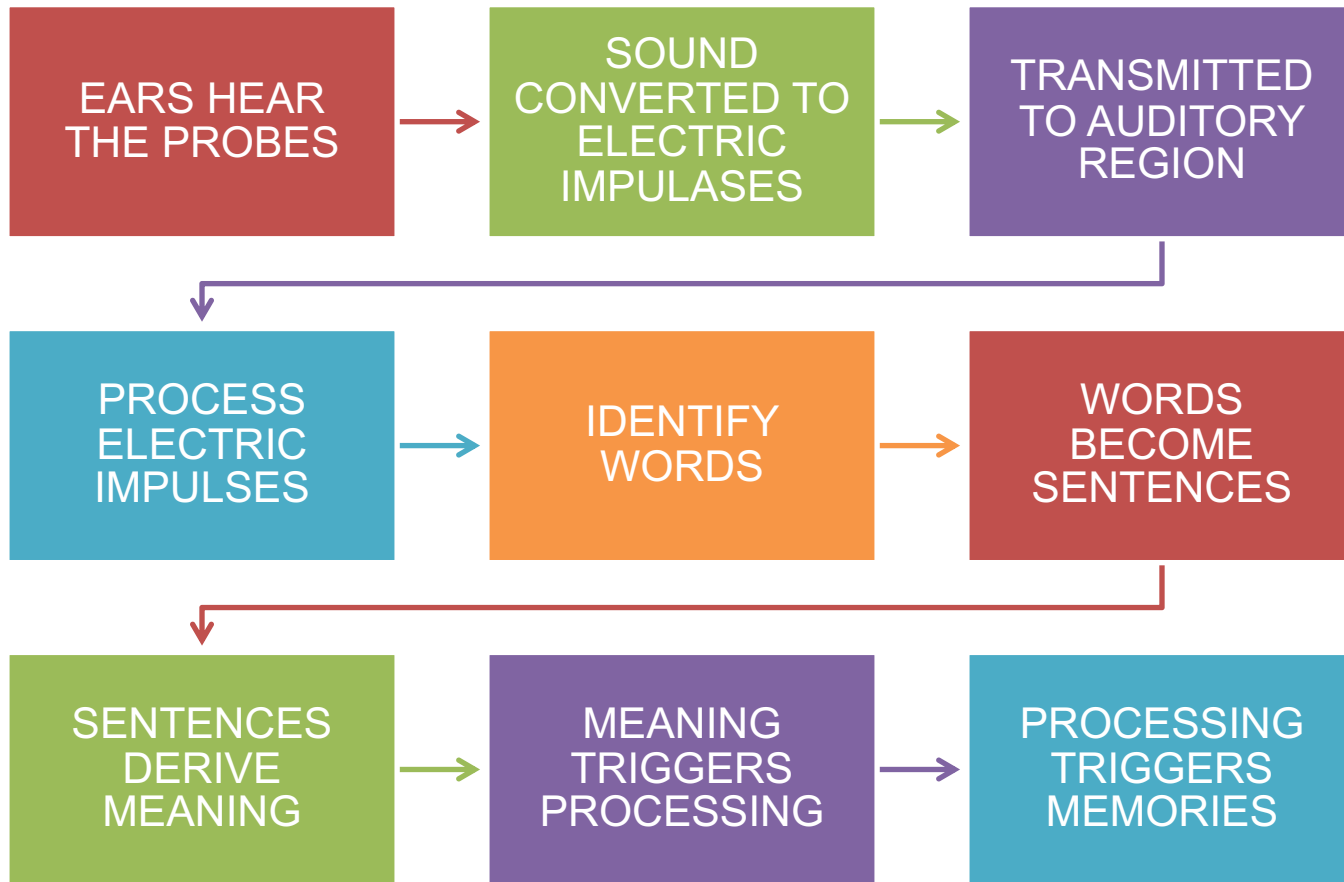
CONCEPTUAL KNOWLEDGE

Acquired through Knowing

conceptualization – thinking

(often Experimentally Verified)

STIMULATE THE BRAIN WITH AUDITORY PROBES



TRACK EACH STAGE

Inattention

- System did not detect sensory registration of the probe, indicating the subject may not have been actively attending to the probe.

Primary Processing

- The Sensory Registration of the probe has taken place - Ears have heard, and the brain (primary auditory area) has "registered" the probe).
- Semantic processing has not taken place within the given duration of the probe analysis.

Encoding

- The probe has been processing semantically by the subject.
- The subject has processed the probe meaning, but has not recalled any related events in the probe analysis duration.
- Encoding can take place only if sensory registration has already taken place.

Encoding ++

- Source Memory has been accessed
- Once the source memory has been accessed, the remembrance process is initiated.
- The person may start attending to what he is remembering.
- When this happens, there is a shift in attention from external sensory inputs to internal signals. The subject is in the process of attending to retrieved information.
- Could lead to an EK

Experiential Knowledge

- Indicative of awareness of remembrance of participating in the said activity cued by probe
- Inferred that the process of remembrance has been cued or triggered by the probe presented to the subject

Emotional Response

- During recall/remembering of the event that is cued by the probe, if there is significant emotional arousal, it blocks further cognitive processing.
- This must be investigated further for understanding the nature of the emotional disturbance that could have occurred in a subject, when the cued event took place.

BEOS

Profiling differentiates
Retrieval of
Experiential Knowledge
from
Conceptual Knowledge

DUAL MEMORY SYSTEMS (1)

System used in Knowing

*Knowing using retrieved
information*

*Recognition of objects/persons/entities/
conditions/changes - external or internal*

*Memory (knowledge bank) of conceptual
information is used for recognition (Knowing)*

DUAL MEMORY SYSTEMS (2)

System used in Remembrance

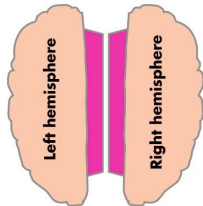
Remembrance of Experience

***Memory of Experiences acquired
during participation in acts***

***Remembrance of
Autobiographical Episodes in life***

Neuroscience of Memory & Awareness

Right Prefrontal Lobe is involved in Retrieval



KNOWING/FAMILIARITY

(Pure Memory recall
no experience or event involved)

- THIS IS JOHN
- THIS IS A HOUSE
- JOHN IS MY FRIEND
- THIS IS A KNIFE
- THIS IS A SHIP
- $2 + 4 = 6$

REMEMBERING

(Awareness recall of past event)

- I SAW JOHN ON MG ROAD
- HE WAS WITH SALLY
- THEY WERE SHOPPING
- I USED THIS KNIFE
- IT WAS MY BIRTHDAY
- TIME & SPACE REFERENCE

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Thank you

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