

The Zodiac Killer



Over 30 years ago, five violent attacks on eight innocent people in the San Francisco Bay Area were attributed to a man known as the *Zodiac Killer*. A bizarre aspect to this case was that after each of the attacks the Zodiac Killer sent letters to police and local newspapers. Over 20 letters were written between 1966 and 1970 and they all began with the greeting: "*This is the Zodiac speaking*" and were signed with an insignia of a cross over a circle. The letters outlined very specific details about the murders and discussed how the victims were chosen based on their astrological signs. The Zodiac Killer threatened newspapers that if they did not publish his letters that he would commit more violent attacks (i.e. set off a bomb in a school bus filled with children).

The Zodiac Killer's Crimes

Attack #1: Victim = Cheri Jo Bates, age 18. Location = Riverside City College.
Date = October 30, 1966.

Cheri Jo's dead body was found late one night in a dark alley with her clothes and purse present and intact. The killer disabled the victim's car and waited for her return. When she arrived she could not start her car and so she asked for help. It is thought that the killer offered her help and after he failed to start the car, he offered her a ride. He then lured her into a driveway between two empty houses where they spent over an hour after which he strangled and then stabbed her numerous times with a small knife.

Attack #2: Victims = Betty Lou Jensen, age 16 & David Faraday, age 17.
Location = Lake Herman Road. Date = December 20, 1968.

While the young couple was parked just off of an isolated road the killer shot out the right rear window and the left rear tire. David was forced to get out of the car because he was killed by a single close-range bullet to the head while standing near the rear of the car. It appeared that Betty Lou tried to run away as her body was found gunned down 30 feet from her car.

Attack #3: Victims = Darlene Ferrin, age 22, & Mike Mageau, age 19.
Location = Blue Rock Springs Golf Course parking lot.
Date = July 5, 1969.

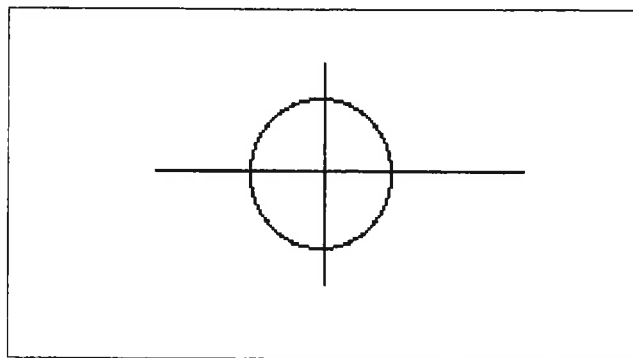
A man carrying a flashlight approached the young couple in their parked car. When the man reached the passenger side of the car he fired a handgun five times through the passenger window. Mike and Darlene were both hit several times at close range. After the man walked back to his car, Mike began to yell in pain, the killer then returned to the car and fired two more shots into each of the victims, then went back to his car. Darlene died in the ambulance on the way to the hospital, while Mike survived after hours of surgery.

Attack #4: Victims = Cecelia Shepard, age 22, & Bryan Hartnell, age 20.
Location = Twin Oak Ridge Lake. Date = September 27, 1969.

As this young couple was having a picnic an unknown man approached them. Just before reaching the couple, the man put on a black hood that covered his face and upper body and then pulled out a handgun. Embroidered on his hood was the same cross-circle design found on letters signed by the Zodiac Killer. The man demanded money and car keys and stated that he was an escaped convict on the run. He then tied the victims up and stabbed them each several times with a large knife. Using a black magic marker the man wrote the cross-circle logo and the date on the door of the victim's car. Cecelia died at the scene, while Bryan survived after hours of surgery.

Attack #5: Victim = Paul Stine, age 29. Location = San Francisco City.
Date = October 11, 1969.

A cab driver was shot at point blank range in the right side of the head. The killer removed the victims wallet and keys, and then cut a large piece from his shirt and took it with him. Three teenagers who were across the street from the cab after the shooting, saw the killer as he was cutting Paul's shirt and wiping down parts of the cab's interior and exterior.



Above = The insignia left by the Zodiac Killer on all his letters.

The Zodiac Killer Fingerprints

One of the most interesting aspects to this case is the substantial amount of fingerprint evidence collected from the letters sent by the Zodiac Killer and from the attacks themselves (see below). Despite this fact, no successful fingerprint matches have ever been made.

Fingerprint Evidence Collected:

- Latent fingerprints were found in and on Cheri Jo Bate's car.
- A latent fingerprint was enhanced on a letter sent by the Zodiac Killer to the local police department after Cheri Jo Bate's murder.
- Latent fingerprints were found on a door handle of the car that Darlene Ferrin and Mike Mageau were in on the night of their attack.
- A latent fingerprint was found on the envelope of a letter sent to local police after the murder of Darlene Ferrin and attempted murder of Mike Mageau.
- Five latent fingerprints were found on letters sent to two local newspapers after the murder of Darlene Ferrin and attempted murder of Mike Mageau.
- Thirty-eight latent fingerprints and three latent palm prints were submitted to the FBI crime lab by the local police after the murder of Cecelia Shepard and attempted murder of Bryan Hartnell.
- Three latent fingerprints were found on a greeting card sent to the *San Francisco Chronicle* in early November after the Paul Stine murder. (*DNA was recovered from saliva on the stamp of this card*).

Current Status of the Zodiac Killer

Despite decades of investigation by four police departments, the California Department of Justice, the US Postal Service, and the FBI, the Zodiac Killer has not been identified. Over 2 500 people have been considered as suspects in this case and the original investigators have all retired.

This case has never been officially closed due to the multiple pieces of evidence collected that could identify the suspect (i.e. eye witness accounts, fingerprints, palmprints and DNA). No one knows if the Zodiac Killer is still alive, however according to police no letters have been received from the Zodiac Killer since 1974.

The Zodiac Killer: Related Questions

Name: _____ Date: _____

Multiple Choice Questions (10 marks)

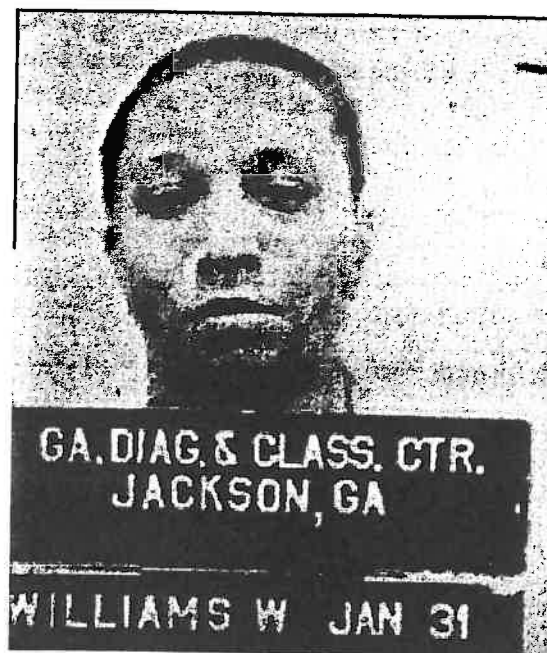
1. The fact that the Zodiac Killer was a male suspect was determined by
 - A. fingerprints left upon the cars from two attacks
 - B. eye witness accounts from two attack survivors
 - C. pubic hairs left upon the clothing of two victims
 - D. DNA evidence from a hair recovered from a victim
2. How was the name Zodiac Killer coined?
 - A. His letters began with "*This is the Zodiac speaking*".
 - B. The word Zodiac was smeared in blood at each attack.
 - C. His phone calls began with "*This is the Zodiac speaking*".
 - D. The word Zodiac was scraped into the skin of each victim.
3. What did the Zodiac Killer use to assault and/or kill his victims?
 - A. A rope or an axe.
 - B. A gun or a knife.
 - C. A poison or a baseball bat.
 - D. A sledge hammer or an ice pick.
4. All of the Zodiac Killer's victims were attacked in or close to
 - A. their home
 - B. their vehicle
 - C. a playground
 - D. a shopping center
5. What types of physical evidence from the Zodiac Killer has been collected?
 - A. Cat hair, blood, clothing fibers, human hair.
 - B. Breath samples, carpet fibers, mDNA, semen, skin.
 - C. Bullet casings, DNA, fingerprints, handwriting, palm prints.
 - D. Bank deposit slips, dog hair, polygraph test, written confession.
6. The type of fingerprints collected from all of the Zodiac Killer crime scenes was
 - A. latent
 - B. visible
 - C. physical
 - D. identified

7. The fingerprint enhancement technique used to enhance the fingerprints found on Cheri Jo Bate's car was likely
- A. luminol test
 - B. lifting powder
 - C. iodine fumigation
 - D. cryanoacrylate fumigation
8. The fingerprint enhancement technique likely used to enhance the five fingerprints found on letters sent to two local newspapers after the attack on Darlene Ferrin and Mike Mageau was
- A. luminol test
 - B. lifting powder
 - C. iodine fumigation
 - D. cryanoacrylate fumigation
9. The most probable reason that the fingerprint evidence collected has not led to the identification of the Zodiac Killer is because he has
- A. no criminal record
 - B. been out of the country
 - C. been dead for a long time
 - D. no social insurance number
10. How was the Zodiac Killer's DNA likely obtained from?
- A. Oil from fingerprints
 - B. Hair from hooded mask
 - C. Blood from cabbie's shirt
 - D. Saliva from postage stamps



DERMATOGLYPHICS = The scientific study of fingerprint ridge patterns.

The Atlanta Child Murders



Mugshot of Wayne Williams

During a two-year period (1979–1981) the bodies of twenty-eight young black males were found in the city of Atlanta, Georgia. The cause of death was from strangulation and asphyxiation. Various types of microscopic evidence were found on each of the victims (ie. carpet fibers, blanket fibers, dog fur). When the press publicized this fact, the killings continued but the victims began turning up nude or partially nude in the Chattahoochee River. This change in the killer's modus operandi (MO) meant that the killer was following the media's reports about the case and was attempting to eliminate any signs of trace evidence.

During May of 1981, in the hopes of catching the killer, police began surveillance along the Chattahoochee River. One night, officers heard a loud splash and then observed a station wagon driving away. Since a body was not immediately found they simply questioned the 23-year-old male driver, Wayne Williams, who said he had dumped a bag of garbage into the river. Two days later the body of another young black male was found in the Chattahoochee River downstream from the area where officers had questioned Wayne Williams. When the body was analyzed by forensic experts unique man-made yellow-green carpet fibers were found in the victim's hair that matched fibers found on some of the other victims. This led police to search Wayne Williams home where yellow-green carpeting was discovered throughout many areas of the house. A short time later, police charged Wayne Williams with two counts of first-degree murder. (It is interesting to note that after his arrest the murders stopped). Police suspected that Williams killed up to twenty-eight young black males, however the prosecution focused their efforts on the last two murder victims found in the Chattahoochee River in the hopes that this would be their best chance of obtaining a guilty verdict.

Microscopic evidence is mainly used to reinforce other types of evidence in a criminal investigation (ie. eye witness statements, fingerprints), however what was unique about

the Wayne Williams case was that microscopic evidence was the only type of physical evidence found and all other evidence was used to support it. The exclusive use of microscopic evidence worked in this case because there were an abundance of fibers and hairs had been collected. Forensic microscopic experts found 28 different pieces of microscopic evidence (ie. hair dog fur, various fibers) on the victims that matched objects associated with Wayne Williams and 19 of these fibers were linked to more than one victim. Only one of the fibers was common (light green cotton fiber), while the rest of the fibers were unique. Since the microscopic evidence was so important in this case, a great deal of information was collected by investigators about each of the fibers.

Information to some of the microscopic evidence that was found upon two victims is outlined below:

TABLE 1 - Fibers found on Murder Victim #1:

Car Carpet Fibers	- Matched the carpet in Williams's car.
Rug Fibers	- Matched the fibers of a small throw rug in William's home.

TABLE 2 - Fibers found on Murder Victim #2:

Door Mat Fibers	- Matched fibers of a small doormat found in the back entry of Williams home.
Carpet Fibers	- Matched fibers in the carpeting throughout William's home.

TABLE 3 - Fibers found on both Murder Victim #1 and #2:

Bedroom Bedspread Fibers	- Matched the bedspread found on William's bed.
Bedroom Carpet Fibers	- Matched fibers in the carpet of William's bedroom.
Dog Fur	- Matched the fur from William's dog.
Blanket Fibers	- Matched fibers of a blanket in William's bedroom.

Another unique aspect to this case was the use of statistical probabilities to prove the significance of the fiber evidence. For example, investigators determined that the yellow-

green carpet fibers left on several victims had been made and sold to various carpet manufacturers from 1970 to 1971. During this one-year period, approximately 16 397 square meters of carpet with this yellow-green fiber were sold in the southern U.S. It was then estimated that only 82 average-sized rooms in the state of Georgia likely had this carpeting. Since there were 638 995 houses in the Atlanta area it was calculated that the probability or chance of a house having this type of carpet was 1 in 7 792 or 0.01%. This proves that the carpet in Wayne Williams' home was quite uncommon and thus finding one of these fibers on a victim was meaningful since it was highly probable that the victim had been in contact with Williams.

The prosecution and forensic experts in this case did an excellent job of presenting the microscopic evidence and related statistical evidence to the jury. Presentation of statistical data to a jury is just as important as the data itself. If members of the jury can not comprehend the stats given the data is useless. After a few hours of deliberation the jury found Wayne Williams guilty of both counts of murder in the first degree. Wayne Williams is currently serving two consecutive life sentences.



Related terms:

Asphyxiation: Death due to being deprived of oxygen and an inability to breathe.

Statistical probabilities: Probability refers to the chance that a particular event or set of events will occur expressed from 0 (impossible) to 1 (certainty) or expressed as a percentage between 0 and 100%. The analysis of events governed by probability is called statistics.

The Atlanta Child Murders: Related Questions

Name: _____ Date: _____

Multiple Choice Questions (10 marks)

1. What was the cause of death for each of the twenty-eight young black male victims in the Atlanta Child murder case?
 - A. Drowning.
 - B. Blunt force trauma.
 - C. Strangulation or asphyxiation.
 - D. Gun shot wounds or stab wounds.

2. Which response identifies the type of microscopic evidence found in the Atlanta Child murder case?
 - A. Paint and cat hair.
 - B. Fibers and dog hair.
 - C. Glass and human hair.
 - D. Blood and bird feathers.

3. How did the killer's MO (Modus Operandi) change after fiber evidence was publicized by the media?
 - A. Victims were stabbed and abandoned at a local dump.
 - B. Victims were poisoned and thrown into local reservoir.
 - C. Jewelry was taken from victims and sold a local pawn shop.
 - D. Clothes were removed from victims and dumped into a local river.

4. Where was the microscopic evidence on the last victim found?
 - A. In his hair.
 - B. In his mouth.
 - C. On his shoes.
 - D. On his clothing.

5. The microscopic evidence on the last victim found in May of 1981 that led police to search Wayne William's home consisted of
 - A. dog hairs
 - B. carpet fibers
 - C. human hairs
 - D. blanket fibers

6. What type of microscopic evidence (out of the 28 collected in this murder investigation) was considered common and thus not very useful?
 - A. White dog hairs.
 - B. Black human hairs.
 - C. Light green cotton fibers.
 - D. Yellow-orange carpet fibers.
7. In most criminal investigations microscopic evidence is used to
 - A. verify the location of the crime
 - B. confirm the identity of the victim
 - C. support the other types of evidence
 - D. associate the victim with the suspect
8. Statistical probabilities were used in this case to
 - A. identify the type of fibers found
 - B. indicate the number of fibers found
 - C. prove the significance of the fibers found
 - D. determine the location of the fibers found
9. What was unique about the yellow-green carpet fibers found in this case?
 - A. They came from Wayne William's car.
 - B. They were created from a rare type of animal hair.
 - C. They came from Wayne William's bedspread.
 - D. They were made and sold only for one year in the early seventies.
10. When statistical evidence about microscopic evidence is used in a criminal case it is important that it is
 - A. analyzed by a judge before the jury
 - B. converted into imperial and metric units
 - C. collected for every piece of evidence found
 - D. presented in a clear and understandable way by the prosecutor

~~~~~  
*"A fiber found on the clothing of a victim that matches the known fibers of a suspect's clothing, can be a significant event."*

- Douglas W. Deedrick, Unit Chief FBI Trace Evidence Unit  
(*Forensic Science Communications*, 2000).  
~~~~~

The Atlanta Child Murders: Related Questions

Name: _____ Date: _____

Written Response Questions: (7 marks)

1. Outline the three advantages gained by the exclusive use of microscopic evidence in this case. (3 marks)
 - i. _____

 - ii. _____

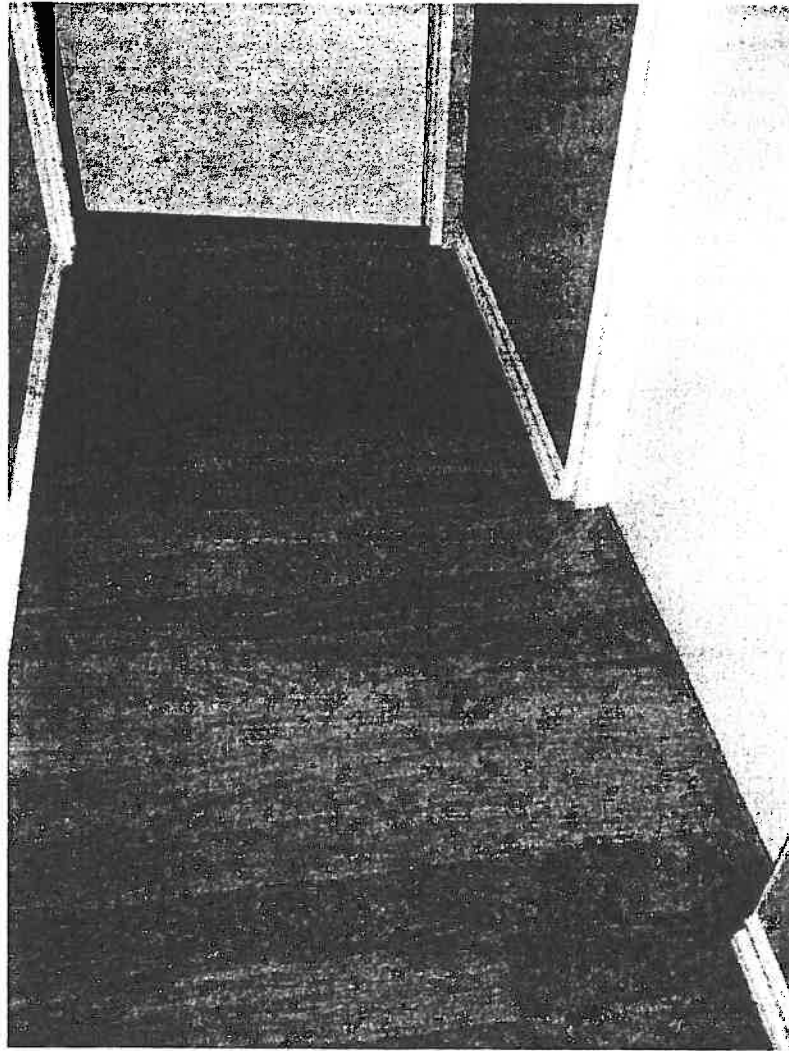
 - iii. _____

2. Why was statistical evidence used in this case? (2 marks)
3. Explain the significance of finding fibers that linked Wayne Williams to both murder victims - see table #3. (2 marks)

Which Neighbour is a Killer?

On April 30th, 1984, police rushed to a local farm after getting a crazed 911 call from Graham Backhouse. When they arrived Graham Backhouse could barely stand as he had several deep cuts on his face and left shoulder. Lying dead on the ground in front of Backhouse's back door was his neighbor, Colyn Bedale-Taylor. Colyn had died from two gunshot wounds to his chest and he had a large knife in his hand.

Graham said that Colyn had tried to murder him with the knife and that after he had fought him off he frantically ran down the hall to get his gun while bleeding from the initial attack. Colyn pursued Graham down the hall with his knife even after Graham told him he was getting his gun. Because Colyn kept coming after him with the knife, Graham told police he had no choice but to shoot him twice in self-defense. After Backhouse had shot and killed Colyn Graham he called police. Officers found the following blood spatter evidence on the floor of Graham's hallway:



Which Neighbour is a Killer?: Related Questions

Name: _____ Date: _____

Multiple Choice: 5 marks

1. Graham Backhouse claimed that Colyn Bedale-Taylor had attacked him with a
 - A. axe
 - B. gun
 - C. knife
 - D. shovel

2. How did Colyn Bedale-Taylor die?
 - A. Lack of oxygen to the lungs.
 - B. Two stab wounds to the heart.
 - C. Blunt force trauma to the head.
 - D. Two gunshot wounds to the chest.

3. The blood spatter evidence found in the hallway of Graham Backhouse's indicates that the blood had
 - A. broken up due to a great force
 - B. partially dried and then been smeared
 - C. free fallen from a slow moving individual
 - D. dropped from an individual short in stature

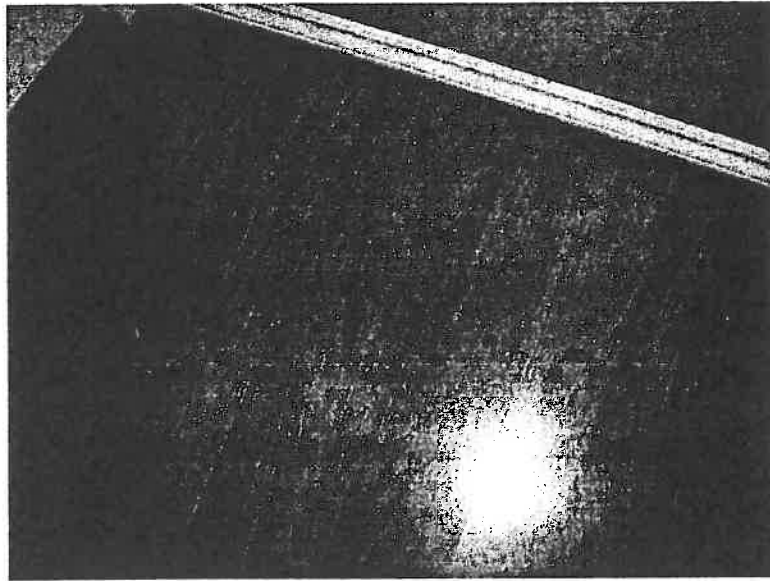
4. It is unlikely that Graham Backhouse had been pursued by Colyn Bedale-Taylor in the hallway because the blood spatter residue was
 - A. not circular
 - B. not smeared
 - C. too small in size
 - D. too large in diameter

5. What type of blood spatter pattern should have appeared near Colyn Bedale-Taylor if Graham Backhouse had shot him in self defense as he claimed?
 - A. A free falling blood spatter pattern.
 - B. A partially dried blood spatter pattern.
 - C. A high-velocity projected blood spatter pattern.
 - D. A medium-velocity projected blood spatter pattern.

Numeric Response: 1 mark

Use the following photo to answer the next question.

Blood Spatter Residue Pattern on Floor of Graham Backhouse's Hallway



Types of Blood Spatter Patterns

1. Free falling
 2. Partially dried
 3. High-velocity impact
 4. Medium-velocity impact
6. From the list above, identify the type of blood spatter pattern from above, that was found in the hallway of Graham Backhouse's home. (1 mark)

Type of blood spatter pattern found in the Backhouse hallway: _____

Written Response: 4 marks

7. Identify and describe two types of blood spatter residue patterns that should have appeared in the hallway of the crime scene according to Graham Backhouse's statement to police. (4 marks)

Pathological Lying

"The pathological liar may become a prisoner of his lies and the desired personality of the pathological liar may overwhelm the actual one."

- Dr. Charles Dike: Forensic Psychiatrist & Clinical Instructor of Psychiatry at Yale University School of Medicine

The only type of person that could lie repeatedly and not exhibit a sympathetic nervous system reaction related to deception would be the pathological liar. It would be difficult to obtain any conclusive results from a pathological liar during a polygraph examination. The pathological liar tells repeated lies over a number of years for no clear reason. Often when a pathological liar tells the same lie repeatedly, he/she begin to believe that it is in fact true; when this occurs they will likely be able to pass a polygraph exam because they think they are telling the truth. The lies from a pathological liar are unplanned, impulsive and often woven into complex stories. Pathological liars may admit that what they have said is false when confronted but then will often proceed to change their stories.

It has still not understood whether pathological liars have control over their lies. Currently the medical community consider pathological lying to be a symptom of a pre-existing psychiatric disorder and not a distinct mental disorder. However, new scientific evidence has emerged that may change this assumption.

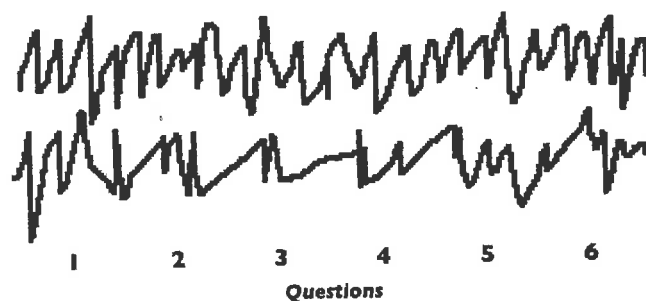
A study out of the *University of Southern California* (USC) has shown that the brains of some pathological liars are different and therefore this suggests that pathological lying could be an unconscious behavior in some people, making it a distinct mental disorder.

In the *British Journal of Psychiatry* (October 2005) the USC researchers reported that they found pathological liars had 14% fewer neuron cells in their brains and greater than 20% more white matter in the prefrontal cortex of their cerebrums as compared to normal people. The prefrontal cortex is the top layer of the cerebrum which controls cognitive functions such as critical thinking and learning, while white matter contains cells that connect brain cells to one another. Conclusions from this study were established using the results from a series of psychological tests, interviews and magnetic resonance images (MRI) of 49 subjects. It is believed the excess of white matter may be associated to a pathological liar's pattern of deceit.

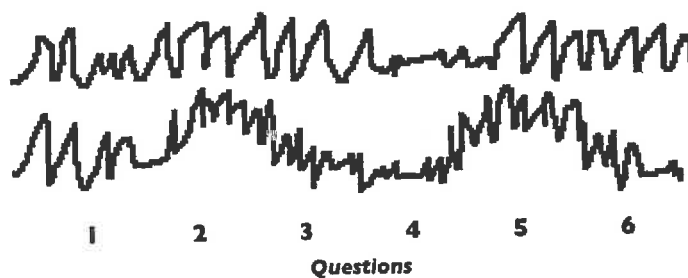
Dr. Charles Dike, a forensic psychiatrist and clinical instructor in psychiatry at *Yale University School of Medicine*, has said that a better understanding of this field of study is necessary

so that the legal system can decide whether pathological liars should be held responsible for their behavior. This could help determine how to deal with pathological liars who provide false testimony while under oath in criminal court cases.

Below = An example polygraph reading from a truthful individual.



Below = An example polygraph reading from a deceptive individual.



~~~~~  
Children are not good at lying, however this changes at about the age of 10 at which time a rapid growth of white matter in the cerebrum occurs – after this point they can become proficient at lying.

- Swaminathan, Nikhil. *Pathological Liars' Brains Physically Different.*  
([www.seedmagazine.com](http://www.seedmagazine.com)), September 30, 2005.



## Pathological Lying: Related Questions

Name: \_\_\_\_\_ Date: \_\_\_\_\_

*Match each of the following terms with the appropriate definition.  
(1 mark each = 10 marks total)*

- A. Change
- B. Complex
- C. Impulsive
- D. Neuron cells
- E. White matter
- F. Legal system
- G. Pathological liar
- H. Sympathetic nervous
- I. Polygraph examination
- K. Distinct mental disorder

1. \_\_\_\_\_ The lies told by a pathological liar are \_\_\_\_\_.
2. \_\_\_\_\_ A pathological liar often weaves his lies into these types of stories.
3. \_\_\_\_\_ This system tends not to react when a pathological liar is being dishonest.
4. \_\_\_\_\_ When confronted, pathological liars may often to do this to their stories.
5. \_\_\_\_\_ Currently the medical community does not consider pathological lying to fall within this category.
6. \_\_\_\_\_ A person that lies repeatedly and does not exhibit the symptoms related to deception.
7. \_\_\_\_\_ It would be difficult to obtain conclusive results from a pathological liar who participates in this type of test.
8. \_\_\_\_\_ USC researchers reported that they found pathological liars had 14% fewer of these in their brains.
9. \_\_\_\_\_ USC researchers found pathological liars had 20% more of this substance in the prefrontal cortex of their cerebrums when compared to normal people.
10. \_\_\_\_\_ A better understanding of pathological lying would help this public institution in deciding whether pathological liars should be held responsible for their actions.