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How reliable are lie detector tests

In February of 1994, the FBI arrested Aldrich Ames, who had been a CIA employee for 31 years. Ames was arrested and charged with espionage. He was a Russian spy. For nine years, he had been passing secrets to the Russians in exchange for over $1.3 million. His spying activities had compromised dozens of CIA and FBI operations. Worse yet, his treacherous crimes had led to the deaths of several CIA spies and the imprisonment of many more. During the time that Aldrich Ames was operating as a Russian spy, the CIA had twice given him a lie detector test. Despite having no special training in how to defeat a lie detector test, Aldrich passed both times. The modern polygraph, better known as the “lie detector test,” is a fascinating little instrument with a long and controversial history. The earliest version a polygraph instrument was developed in 1921 when John Larson cobbled together previously developed measures of respiration, heart rate, and blood pressure that had individually shown promise as a measure of lying. Technological developments continued, and the modern polygraph is now an integrated, state-of-the-art, computerized system that continuously monitors blood pressure, heart rate, respiration, and perspiration. The theory behind the polygraph is that when people are lying, they experience a different emotional state than when they are telling the truth. Specifically, it is thought that when people are lying, especially in high stakes scenarios such as police interrogations, they are anxious or afraid of being caught in a lie. When guilty people are asked questions that would reveal their guilt (e.g., Where were you last Tuesday?), and they lie, the fear of being detected causes increased activation of their sympathetic nervous system. This activation leads to an increase in heart rate, blood pressure, respiration, and perspiration. These changes are part of the fight-or-flight system that initiates whenever was are scared. You have probably felt your heart pounding or your palms sweating when faced with danger, be it a vicious dog, an angry boss, or an upcoming exam. The polygraph is designed to detect those subtle changes in a person’s physiological responses when they lie. The general idea is that when a person is being honest, their physiological responses remain stable under questioning, whereas a guilty person’s heart will race. One of the most common polygraph procedures is called the comparison question test (also called the control question test). The examinee is asked relatively benign questions such as “Where do you live.” They are also asked questions that are not relevant to the crime, but which would likely trigger an emotional reaction such as, "Have you ever told a lie?” They are then asked questions about the alleged crime such as, “Did you steal the documents?” The premise of the comparison question test is that a guilty person will have a much stronger physiological reaction to the crime question, whereas an innocent person will not. The polygraph is used in criminal investigations, although it is generally not admissible as evidence in a trial. It is also used as a pre-employment and continuing employment screening tool for many federal employees who work in sensitive positions, such as CIA agents and FBI agents. Private businesses, however, cannot force their employees to submit to a polygraph test. So, does the polygraph actually work? Are the results accurate? It does work much of the time. Typically, when someone is lying, a well-trained polygraph examiner can tell. It is not 100% accurate though. The American Polygraph Association is the world's leading association dedicated to the use of evidence-based scientific methods for credibility assessment. It is an organization whose members are largely polygraph examiners. They estimate the accuracy of the polygraph to be 87%. That is, in 87 out of 100 cases, the polygraph can accurately determine if someone is lying or telling the truth. That sounds pretty impressive, but it is important to keep in mind that the polygraph is failing 13% of the time. The federal government sought an unbiased evaluation of the polygraph, so they tasked the National Academy of Sciences with a full investigation of the polygraph’s accuracy. In 2003, this large team of notable scientists came to the conclusion that the polygraph was far less accurate than the polygraph examiners had claimed. Some scientists have claimed that the accuracy may be closer to 75%. This lackluster performance is the reason why polygraphs are not used as evidence in criminal trials. They just cannot be trusted. For more clear evidence that the polygraph is unreliable, just look back to the Alrich Ames case mentioned at the top of this article. Ames lied during his polygraph examinations at the CIA, and he passed each time. In this case, the lie detector test failed. When asked how he passed the polygraph test, Ames said that he followed the advice of his Russian handlers. They told him, "Just relax, don't worry, you have nothing to fear." The Russians knew that the polygraph was flawed. They knew that it was only accurate if the examinee was worried and anxious. They knew that if Ames could just relax, he would pass. Find a Career Counseling Therapist Get the help you need from a therapist near you–a FREE service from Psychology Today. Atlanta, GA Austin, TX Baltimore, MD Boston, MA Brooklyn, NY Charlotte, NC Chicago, IL Columbus, OH Dallas, TX Denver, CO Detroit, MI Houston, TX Indianapolis, IN Jacksonville, FL Las Vegas, NV Los Angeles, CA Louisville, KY Memphis, TN Miami, FL Milwaukee, WI Minneapolis, MN Nashville, TN New York, NY Oakland, CA Omaha, NE Philadelphia, PA Phoenix, AZ Pittsburgh, PA Portland, OR Raleigh, NC Sacramento, CA Saint Louis, MO San Antonio, TX San Diego, CA San Francisco, CA San Jose, CA Seattle, WA Tucson, AZ Washington, DC More from Christian L. Hart Ph.D. More from Psychology Today Editors: Tharindi Jayatilake and Anand Soma Do you solemnly swear to tell the truth, the whole truth, and nothing but the truth? In almost every crime show, the suspect would be sweating profusely in the interrogation room as the detectives hook him up with a polygraph to determine if he is guilty or innocent. A lie detector, otherwise known as a polygraph test, is a device that measures several physiological indicators such as blood pressure, heart rate, respiration, and skin conductivity. The earliest version of the lie detector test was created in 1921 by John Larson, and as technology constantly grows, the new computerized model continues to monitor the same measures in the past. However, there has been some debate regarding whether or not lie detectors are reliable as there are no specific physiological reactions associated with lying. Polygraphs are constantly being used by law enforcement and it is mostly used to measure fear and nervousness based on main physiological indicators. Investigators created a technique that is still widely used today called the “Control Question Technique”. The interrogator would mix control questions from non-threatening and random questions that aren't related to the case to relevant questions pertaining to the case. By using this technique, it would create some anxiety for the suspect because they would have to tell the truth with vague questions. Although, it has been shown that even innocent people can have greater levels of nervous activity due to the circumstances they are in especially if they got accused of a crime. According to the Psychological Set Theory, a person getting tested anticipates negative consequences if he/she lies, so their body produces a certain measure of physiological reactions that could signal deception. Another procedure investigators use is the “Guilty Knowledge Test” which is a multiple-choice test that has the information only the guilty person would know. However, this procedure is rarely used because the investigators don’t always have enough information to create the test. Another flaw could be in the other factors that might have occurred without law enforcement knowing about it. This was created based on the Oriental Response Theory, or the oriental response, which is the organism’s response to a change in its environment that creates an adaptive response to the stimulus. The oriental response is subject to habituation where the subject can familiarize and prepare themselves with the questions that could lead to invalid results. According to the American Psychological Association, “A particular problem is that polygraph research has not separated placebo-like effects (the subject’s belief in the efficacy of the procedure) from the actual relationship between deception and their physiological responses." Subjects who believe the lie detector test works tend to confess more easily or become more anxious, thus providing a lower accuracy rate for determining lies. There are also possible countermeasures that can help block certain physiological responses such as using drugs that alter arousal, psychological manipulation, and small physical movements. Overall, the polygraph test is mostly used to detect the anxiety levels connected to the physiological responses which give clues of deception; however, it is not always accurate for every person. There has also been a new study involving the updated version of the lie detector test through brain scans and imaging. The near-infrared brain scan is a headband that emits near-infrared light into the subject's prefrontal cortex where most of the decision-making occurs. The sensors can detect the changes in blood flow once the subject decides to lie even before they get to say it. The device is currently under development because researchers are still gathering data from subjects who answer the control questions truthfully or not. In addition, functional magnetic resonance imaging (fMRI) has already been used to detect brain abnormalities; however, studies based on the fMRI show that the anterior cingulate cortex and the superior frontal gyrus light up more when a person tells a lie than telling the truth. These regions of the brain are associated with emotional processing, decision-making, and conflict resolution. Lying can impact these regions through higher levels of anxiety because they have to quickly think of a response to the question and try to process their emotional state. The fMRI can be improved with the transcranial magnetic stimulation that enhances or blocks out certain activities in the brain to improve the accuracy of the lie detector. Another new procedure used was brain-fingerprinting through an electroencephalogram (EGG), a helmet with electrodes attached to the head to record changes in electrical activity in the brain. A P300 pattern, a specific brain wave, is elicited when the subject knows the information but chooses to lie about it. This happens when the brain believes the information is important or surprising to the subject. However, similar to the flaws of the polygraph, drugs or medications can affect the brain waves and it can only be used once the investigators have enough information about the case. Overall, rather than trying to detect the physiological responses, looking for certain brain wave patterns could be more useful because other factors such as anxiety and the placebo effect can create false negatives for the subjects. As a result, some court cases hesitate to accept lie detection tests as admissible evidence due to its uncertainty of testing for deception. Overall, the lie detector test has high reliability considering it is widely used in law enforcement; however, there are still concerns about its validity and accuracy of the test. Not only are innocent people victim to the psychological and physiological turmoil, but the guilty are free to roam the earth. Researchers are still trying to develop new devices to detect lying, but it might not happen until the far future as we continue to use the same methods from the past. And in the words of Benjamin Franklin, “half a truth is often a great lie”Gonzalez, Nora. “Do Lie Detectors Actually Work?”. Britannica. Tancredi, R. Laurence. “The New Lie Detectors”. Scientific American. 15 April 2005: . 21 September 2020Hart, L. Christian (Ph.D.). “Do Lie Detector Tests Really Work?”. Psychology Today. 14 January 2020: deception/202001/do-lie-detector-tests-really-work. 21 September 2020Cino, G. Jessica. “Is a polygraph a reliable lie detector?”. Phys Org. 1 October 2018:Baran, Madeleine and Vogal, Jennifer. “Inconclusive: The truth about lie detector tests”. American Public Media. 20 September 2016: The Truth ABout Lie Detectors (aka Polygraph Tests). American Psychological Association. 5 Updated 12/13/2023 The results of lie detector tests—or polygraph tests—are rarely allowed as evidence in criminal trials. Read on to learn why courts typically distrust lie detector tests and the limited instances in which their results may be permitted. What Is a Polygraph or Lie Detector Test? Polygraph machines simultaneously monitor several of a subject's physiological functions—breathing, pulse, blood pressure, perspiration, and skin conductivity—while being questioned. A printout or graph shows exactly when, during the questioning period, physicological responses occurred or changed. The theory underlying a lie detector test is that lying is stressful, and that stress can be measured and recorded on a polygraph machine by monitoring changes to the subject's physiological functions. How Do Lie Detector Tests Work? There's more to the polygraph test than the machine itself. The entire procedure can be divided into four basic parts—a pretest, control questions, the test, and a post-test evaluation. 1. Typically, the examiner conducts a pretest a few days or sometimes weeks before the actual test. This pretest allows the examiner to gather information about the subject, test out different questioning techniques, and review the subject's responses. 2. At the start of the actual test, the examiner may use control questions to test the subject's physiological responses and compare those responses to those elicited from relevant test questions. 3. The examiner conducts the polygraph test by asking a series of questions and recording the subject's physiological responses to those questions and the answers. 4. After completing the test, the examiner must evaluate the questions, answers, and physiological responses. Are Lie Detector Tests Accurate? It depends on who you ask. The American Polygraph Association cites research results that suggest polygraphs are accurate between 80 to 90% of the time. A different "APA"—the American Psychological Association—argues that polygraph accuracy can't be measured because the science is theoretical. They state there's no scientific proof that stress signals that a person is lying. Can You Trick a Lie Detector Test? Again, the answer depends on who you ask. The American Polygraph Association acknowledges that "all things made by man can be defeated." However, they note that new sophisticated software and recording equipment make it very difficult to "beat" the polygraph. On the flip side, a paper on the American Psychological Association website suggests that various methods can be used to alter polygraph results, including adjusting one's physical movements, taking drugs, or trying to alter one's physiological responses. Can Lie Detector Results Be Used in Criminal Court? Not usually, and almost never when it comes to using the results as evidence of guilt or innocence. The fact that a defendant took or refused to take a polygraph test also isn't allowed as evidence. Unreliable Evidence To be admissible in a case, scientific evidence must be relevant and reliable. Because substantial conflict exists in the scientific community regarding the reliability of polygraph results, most judges won't allow polygraph results to be admitted as evidence. Courts also limit its use because credibility determinations are for a jury to make (not a machine). (U.S. v. Scheffer, 523 U.S. 303 (1998).) State Bans vs. Case-by-Case Decisions A few states have outright bans that prohibit the admissibility of polygraph results as evidence. Other states let judges decide on a case-by-case basis. If a party seeks to introduce polygraph evidence for a purpose other than determining the truth of a matter, the judge may allow it. For instance, a judge might allow a subject's answer to a polygraph question for impeachment purposes (to discredit their testimony). Sometimes, a judge may allow the results if both parties agree to it (called a stipulation) or in pretrial or post-trial motions that don't go to a jury. Non-Court Uses of Polygraph Results Outside the courtroom, polygraph results may be used in certain employment or security investigations—but these uses may also be subject to legal restrictions. For instance, there is a federal law known as the Employee Polygraph Protection Act (EPPA). It's always a good idea to consult a lawyer before agreeing to a polygraph test. Talk to a Lawyer If you're being investigated in a criminal matter, talk to a criminal defense lawyer before agreeing to take a lie detector test. You can't be forced to take a polygraph test. And often it's in your best interests not to take the test. Pablo Gerboles is a maverick thinker with a formula that can transform vision into velocity. He founded Pabs Tech Solutions to help entrepreneurs propel their abstract ideas into fully operational businesses with unprecedented speed. At the heart of this approach for all types of software-focused companies is a simple yet powerful equation: clarity plus speed. Gerboles doesn’t just talk about ideas. He pulls them from the abstract into the grounding realm of reality and breathes life into them at lightning speed. But how does he do it? It all begins with clarity. Even when an idea is shrouded in abstraction, he insists on defining its core purpose: What problem does it solve? Who is the target audience? How does it align with market demands? Clarity, as Gerboles sees it, serves as the North Star, guiding every subsequent decision. Once the vision is clear, the journey from concept to launch is a meticulous yet agile process “We don’t waste time overthinking every little detail,” Gerboles explains. “Our goal is not to build something perfect. We build something that works and evolves.” With the final concept in sight, Gerboles reverse-engineers the steps to make it a reality. Focusing first on a minimum viable product enables the team to expedite the building and testing phases in a process that prioritizes real-world feedback over abstract theorization and ensures that genuine user experience informs each iteration of the project. In today’s market, founders need to move fast. After all, clarity without speed is just a nice idea that never comes to fruition. But without clarity, speed spirals into chaos.Gerboles’ philosophy underscores the symbiotic relationship between these two principles “Clarity tells you where to go, but speed gets you there before the opportunity passes,” Gerboles explains. “You need both.” In tech and emerging industries, the window for opportunity is fleeting. “We move quickly, but we don’t guess,” Gerboles adds. “We base our decisions on data, instinct, and constant feedback loops.” Gerboles’ team knows that momentum is a real asset. “You can adjust a fast-moving car,” Gerboles notes, “but you can’t steer a parked one. We need momentum. It breeds confidence, attracts talent, and garners buy-in from stakeholders.” Another cornerstone of Gerboles’ approach is building a custom team. He starts by closely examining a startup’s business model. Whether it’s tech-centric, sales-oriented, or operations-focused, he firmly believes that the team’s structure must align with the business model’s unique needs. Gerboles’ strategy is both pragmatic and visionary. “We build teams like we build products — custom, lean, and aligned with the business model. We identify the key business drivers, then we plug in the people who thrive in that kind of environment.” When searching for new team talent, Gerboles’ global outlook dissolves geographical constraints. “There’s no reason to limit yourself to local talent when you can build teams with worldwide specialists who’ve already done what you’re trying to do,” he says. “That flexibility lets us keep overhead low and execution high.” According to Gerboles, innovation thrives at the intersection of creativity and systems thinking. “Think of it like jazz,” he says. “We improvise when we need to, but we always come back to the structure. That’s how we scale without burning out.” In essence, creativity fuels the inception of ideas, while systems sustain them. This dichotomy creates a harmonious cycle of ideation and execution. Systems in Gerboles’ framework do not stifle a startup’s creativity; they fortify it. Once an experiment proves successful, Gerboles’ team rapidly systematizes it, enabling them to pivot to fresh challenges and ideas. “If everything is chaos, creativity dies,” Gerboles notes. “But if everything is rigid, nothing new ever happens. That’s why we find the middle ground.” As a forward-thinker, Gerboles is acutely aware of AI’s transformative potential. “Tasks in the innovation process, like product research, customer segmentation, copywriting, and even coding, used to take months. Now, we can do them in days or hours.” Gerboles sees upcoming founders and entrepreneurs collaborating closely with AI in the innovation process. He is already designing tools that enable AI to handle 80% of the backend tasks, empowering founders to focus on the critical 20%: vision, strategy, and relationship-building. “AI won’t replace good judgment; it will amplify it,” Gerboles cautions. “Founders who are clear on their vision and fast on execution will use AI as leverage, not a crutch. The businesses that win in the future will be the ones that know how to integrate AI, not just use it.” In a bold prediction, Gerboles foresees the rise of the solo entrepreneur — a pioneer who leverages AI to run an entire company. “We’re going to witness the first billionaire who runs an entire company solo, with AI handling everything else. No employees, no offices, just a vision, a laptop, and a network of intelligent systems.” This is an era in business where vision and velocity are tightly woven into the fabric of success. By marrying clarity with speed, building adaptable teams, and striking a balance between creativity and systems, Gerboles crafts the blueprint for rapid innovation and growth. Every second counts, and his approach offers a roadmap for those daring enough to move at the speed of innovation. To spot a liar, ignore everything except the level of detail in a person's story, new research suggests.If a person provides rich descriptions of who, what, when, how, and why, it's likely they are telling the truth. If they skim over these details, they are probably lying. Using this very simple test and nothing else, people can separate truth from lies with nearly 80 percent accuracy, researchers from the University of Amsterdam have found. When it comes to catching liars, we usually try to employ as many tell-tale signs as possible into our assessment. Do they look shifty? Are they anxious? Why are they fidgeting? After the 9/11 terror attacks, for instance, US airport security personnel were trained to look for 92 behavioral clues that a person was being deceptive. Polygraphs, commonly called lie detectors, combine different physiological inputs such as blood pressure, heart rate, and breathing rate to detect possible lies. However, research shows that even trained professionals do little better than random chance when attempting to separate truth from falsehoods. Part of the problem is that integrating lots of conflicting data points on the fly and converting that to a binary decision about whether someone is telling a lie is extremely difficult. "It's an impossible task," says Bruno Verschuere, a forensic psychologist and lead author on the study. "People can't assess all those signals in a short time, let alone integrate multiple signals into an accurate and truthful judgment." Another problem is that people have stereotypes about what innocent and guilty people look like, which are not very predictive of truth-telling or lying. To overcome these issues, Verschuere and his colleagues at the University of Amsterdam decided to try a "radical alternative". They instructed study participants to focus on only one clue – the level of detail in a person's story – and ignore everything else. "We reasoned the truth may be found in simplicity and we propose to drop rather than add cues when trying to detect deception," the researchers say. In a series of nine studies, 1,445 people were instructed to guess whether handwritten statements, video transcripts, video interviews, or live interviews about a student's activities on campus were true or false. These accounts came from students who had either enacted a mock theft of an exam for a locker and lied about it, or had innocently wandered around campus and told the truth about their activities. The study participants who relied on intuition to detect lies, or who used many factors to make the decision, performed no better than random chance. But those who were instructed to focus solely on the level of detail in the accounts could accurately separate truth and lies with 59–79 percent accuracy. These participants were told to examine the "degree to which the message includes details such as descriptions of people, places, actions, objects, events, and the timing of events," and "the degree to which the message seemed complete, concrete, striking, or rich in details". "Our data show that relying on one good cue can be more beneficial than using many cues," the researchers say. The researchers' 'use-the-best (and ignore-the-rest)' rule of thumb was a superior lie detection method, regardless of whether the participants knew that the purpose of the activity was to detect lies or not. This suggests that pre-existing stereotypes about guilt and innocence were not getting in the way of using the level of detail as a lie detection tool. In high stake situations, it's likely that people will enrich lies with details to increase their credibility, so it's possible that lie detection rules of thumb will be context-dependent, the researchers say. However, using more and more cues – or even big data and machine learning – isn't necessarily going to improve accuracy in lie detection, they argue. In a previous study using 11 different criteria to detect lies, people correctly rated the level of detail but the other, useless information clouded their overall judgment. "One counterintuitive way of dealing with an information overload is to simply ignore most of the available information… Sometimes, less is more," the researchers say.This paper was published in Nature Human Behaviour.