Law Enforcement Polygraph Examiner Training

2016 School Calendar Class Dates
February 22 - April 29
September 26 – December 2
10 week on campus course

Specializing in:
- Over 95 years in Instructor Experience
- Instruction in all recognized techniques
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- Post-graduate Workshops
- Equipment Discounts

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IAP@DECEPTION.COM
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**Deadlines**

This issue closed on October 7, 2016.

Deadline for November/December 2016 issue is November 30

**Submission of Articles**

The APA Magazine is published by the American Polygraph Association. All views, opinions and conclusions expressed in this magazine are those of the authors, and do not necessarily reflect the opinion and/or policy of the APA or its leadership. References in this magazine to any specific commer
cial products, process, or service by trade name, trademark, manufac-
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org. E-mail notification is sent to subscribers when the latest publication
is available. The APA webmaster is not responsible for issues not received
because of improper address information. Submission of polygraph-relat-
ed articles should be sent to: Mark Handler, editor@polygraph.org.

POLYGRAPH COURSE TUITION $4795!

2016 Schedule
Basic Examiner
♦ Feb - May (San Antonio)
♦ Sept - Nov (San Antonio)

Validated Interview
♦ July & Nov 2016
♦ Call to host a course

JPCOT/PCSOT
♦ May (San Antonio)
♦ Nov (San Antonio)
♦ Dec (Las Vegas)

TDLR CE Course
♦ Contact us for scheduling

The successful completion of an APA accredited polygraph program is only one of the necessary prerequisites for membership in the American Polygraph Association or other organizations.

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Greetings from the editor’s desk…

The 51st annual APA seminar has come and gone and was outstanding. The Baltimore venue was just wonderful- kudos to Mike Gougler, Lisa Jacocks, Gordon Vaughan, Chad Russell, and Stephanie Prairie for a smooth week. I was sad to see some of our board members leave and excited to see new board members sworn in. I have to shout out to Donnie Dutton for helping Gordon Vaughn facilitate the panel discussion. It was truly one of the highlights of the week of training and Donnie did yeoman’s work of making it happen. Jack Trimarco personally sought the guest speaker, Rick Dempsey who was funny, articulate and entertaining and we are going to share a lot of pictures from the seminar with you. We have a couple of interesting articles from our international community we hope you enjoy. We have a few educational pieces, as well.
Dear Mark,

Since 2011 I am a regular contributor to the APA Magazine in my column “Practicum”. Judging by the comments and requests made during the years to use some of my articles as learning material and/or re-publish them, I may take an educated guess that some members found some of them practical as were their purpose.

Unfortunately for reasons beyond my control and with great sorrow I am forced to depart from publishing, at least for now, my column in the Magazine. I am taking this opportunity to thank you for giving me the stage and your predecessor Don Kraphol for inviting and honoring me with writing my column. And last but defiantly not least to all of my APA friends for the support and for being patient with me.

Very friendly yours

Tuvya T. Amsel, PhD

The author is a private examiner in Israel, and a regular contributor to the publications of the American Polygraph Association. The views expressed in this column are solely those of the author, and do not necessarily represent those of the American Polygraph Association. Publishable comments and replies regarding this column can be sent to editor@polygraph.org.
THURSDAY - SATURDAY, FEBRUARY 2-4, 2017
Thursday 1:00 pm – 5:00 pm
Friday and Saturday 8:00 am – 5:00 pm

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*must be a paid up member of NMSFP

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TOPICS
GREG MILLER, ESQ. and MARK HANDLER, APA Editor
From Frye to Daubert & Beyond
Courtroom Testimony: Pitfalls to Avoid
Daubert Hearing Demonstration
Q&A
WALT GOODSON – APA Chairman of the Board
Countermeasures
Screening Examinations
Administering Defensible Examinations
ESS

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All expenses of continuing education (including registration fees, travel, meals and lodging) taken to maintain and improve professional skills are tax-deductible subject to the limitations set forth in the Internal Revenue Code.

(The registration fee includes professional instruction, seminar materials, AM and PM Refreshment Breaks)

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CES-Albuquerque, NM (Feb. 2-4, 2017) We can not possibly reach everyone who would be interested in taking part if this seminar. Please help us by making copies of the page for your co-workers and business associates. Thank you for your assistance.
American Polygraph Association  
Continuing Education Seminar  
Co-Sponsor Virginia Polygraph Association  
November 3-4, 2016 (Virginia Beach)

PCSOT Advanced Course (Virginia Beach, VA)  
November 2, 2016

Continuing Education Seminar  
Co-Sponsor New Mexico Polygraph Association  
February 2-4, 2017 (Albuquerque, NM)

National Polygraph Association  
Continuing Education Seminar  
January 16-18, 2017 (Las Vegas, NV)

Attention School Directors  
If you would like to see your school’s course dates listed here, simply send your upcoming course schedule to editor@polygraph.org
SCHEDULE

Sunday, January 15, 2017

1:00 pm  Open NPA Board Meeting
Members urged to attend

Monday, January 16, 2017

7:45 am  Open Remarks
8:00 —10:00  Persuasive Pre-Test
10:00—10:30  Stoelting Vendor Presentation
10:30—12:00  Persuasive Pretest (cont)
12:00—1:00  Lunch
1:00—3:00  Persuasive Pretest (cont)
3:00—4:00  Putting Out Your Shingle

4:00 pm—6:00 pm  Social Reception: Hosted by Complete Equity, Inc.

Tuesday, January 17, 2017

8:00-10:00  Federal Zone/Federal You Phase
10:00—10:30  Lafayette Vendor Presentation
10:30—12:00  Federal Zone/Federal You Phase
12:00—1:00  Lunch
1:00—3:00  General Business Meeting
3:00—5:00  Plethysmograph (PLE)

Wednesday, January 18, 2017

8:00—10:00  AFMGQT & Scoring
10:00—10:30  Limestone Vendor Presentation
10:30—12:00  AFMGQT & Scoring (cont)
12:00—1:00  Lunch
1:00—1:30  Axciton Vendor Presentation
1:30—5:00  Pharmacology & Chemical Countermeasures
5:00 Closing Remarks

Wednesday, January 18, 2017
(Dedicated PCSOT Training)
Merion Classroom

8:00—12:00  Peak of Tension in PCSOT
12:00—5:00  PCSOT

For Hotel Reservations Call 1-800-331-5731 and mention the National Polygraph Association 2017. Reservations must be made by December 16, 2016 to receive Seminar Rate. Saturday arrivals are limited.

The 2016 Seminar and Business Meeting will be held at the Golden Nugget Hotel & Casino, Las Vegas, Nevada. Rooms rates for the seminar is $ 59.00 per night (Sunday-Friday) excluding any applicable tax and energy surcharge. In addition the hotel charges a $20 resort fee which includes many amenities normally incurred as additional charges.
REGISTRATION

Name: ____________________________

Company: _________________________

Address: __________________________

City/State/Zip: _____________________

Telephone: _________________________

Email: ______________________________

PCSOT Training: Yes ☐ No ☐

Registration Cost:

Member: $150.00 (advance)

$175.00 (at door)

Nonmember: $350.00*

Credit cards accepted only on NPA website

*NOTE: If you join the NPA prior to the seminar you can register at the member price. Annual Dues are $100.00. (Application on the NPA website, nationalpolygraph.org.

Mail registration and check to:

National Polygraph Association
P.O. Box 460672
Papillion, NE 68046

SPEAKERS

Dennis Westerman: Lieutenant Westerman has 30 years of Law Enforcement, and currently serves as Lieutenant and Quality Assurance for one of Texas Department of Public Safety (DPS) Criminal Investigations Division’s Polygraph Units. He is currently the Coordinator for Texas DPS Law Enforcement Polygraph School and has instructed for APA, AAPF and numerous other Federal and State organizations and associations. He was recognized as the 2012 Texas Association LE Polygraph Investigator of the Year.

Matthew Mull: Lieutenant Mull has served over 20 years as a Texas Trooper and for Texas DPS. He graduated from Texas DPS in 1995 and served in Special Crimes/Criminal Intelligence. He is a former coordinator for DPS Law Enforcement Polygraphs and has instructed there since 2007. He currently serves at DPS headquarters and is a Lieutenant in the DPS Polygraph unit.

Gregg Mrochko: Lieutenant Mrochko received his B.A., Administration of Justice from the University of Pittsburgh and graduated the Northeast Counterdrug Polygraph Program (NCTC) in 2004, administering polygraph examinations since that time. He is an adjunct instructor at (NCTC) and has instructed at NCCA. He is the Board President for the Polygraph Law Enforcement Accreditation organization and has provided advanced instruction to Senior Examiner courses in the U.S.

Mark Holtsmaster: Sergeant Holtsmaster received his B.A. Economics from University of Scranton. He has served with the Pennsylvania State Police since 1993 and an examiner since 2008. He is an adjunct instructor at the NCTC Polygraph Program and instructed at NCCA. Mark has also taught advanced instructions at Senior Examiner Courses in the U.S. Since 2011, he serves as the Polygraph Coordinator for the Pennsylvania State Police supervising more than 20 polygraph examiners across the State. He is also a member of the Polygraph Law Enforcement Accreditation (PLEA) organization, accrediting LE polygraph programs in the U.S.

Patty Odum, RN, MSN, FNP-BC. Patty is a board certified Family Nurse Practitioner. She graduated Summa Cum Laude from Western University of Health Sciences with a M.S. in Nursing. She graduated Magna Cum Laude from the University of Colorado with a B.S. in Nursing. Mrs. Odum has 22 years of nursing experience and provided comprehensive care as a nurse practitioner in Internal Medicine, Oncology, Geriatric and Hospice. She is currently an instructor at Marston Polygraph Academy in Pharmacology and Chemical Countermeasures.

Chip Morgan: Chip is a nationally recognized trainer and lecturer proving instruction for over 35 years at polygraph schools, national training seminars and colleges throughout the U.S. Canada and Mexico. Chip is a 1975 Backster school graduate and served as a Detective, Criminal Polygraph Examiner. He maintains a thriving private practice. He is the past president of the National Polygraph Association, International Brotherhood of Police Officers, Boise Police Association, Idaho Fire & Arson Investigators and several other professional associations. Chip is a Court Certified Expert in Idaho and California State Courts and the US Federal Court Systems. He has been a certified Instructor since 1980 and is a published author.

Melanie Javens: Melanie began employment at Complete Equity Markets in 1988 as receptionist. She quickly made her way up the ranks first as a word processor and then as an administrative assistant. She obtained her property/casualty and Life/Health insurance licenses and began her career in sales over 25 years ago. She currently underwriters Professional Liability for Safety Professionals, Polygraphists & Forensic Consultants and is President of three risk purchasing groups.
AMERICAN POLYGRAPH ASSOCIATION (APA)
CONTINUING EDUCATION SEMINAR
CO-SPONSOR – VIRGINIA POLYGRAPH ASSOCIATION
ADVANCED REGISTRATION IS REQUIRED

APA FED ID # 52-1035722

WEDNESDAY, NOVEMBER 2, 2016
8:00am – 5:00pm

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VIRGINIA BEACH, VA 23451
To make Hotel Reservations:
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Room rate: $96.00, SINGLE/DOUBLE, plus taxes (currently 14% tax, PLUS $1.00 per room per night occupancy tax) SELF PARKING is complimentary. (NOTE: Room rate is based on government per diem rates and may change minimally in October 2016)

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ERIC J. (Rick) HOLDEN

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$300 Non-Member

*must be a paid up member of VPA

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TOBICS
Law and Ethics in Credibility Assessment – Gordon
Vaughan, APA General Counsel

Panel Discussion: Hot Topics – Gordon Vaughan,
Walt Goodson

Understanding Countermeasurers and Improving
Chart Data – Walt Goodson

Interview and Interrogation – Blake McConnell

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Continental Breakfast and Lunch)

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FRIDAY ___ YES ___ NO ___ #ATTENDING

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LAS VEGAS METROPOLITAN POLICE DEPARTMENT invites applications for the position of:

Polygraph Examiner (Appointed)  
C16-260  
Position Type: Open Competitive

The LVMPD is an EEO employer, accredited by the Commission on Accreditation for Law Enforcement Agencies (CALEA), and maintains a drug-free workplace.

SALARY:  
$34.65 - $49.35 Hourly  
$6,005.89 - $8,553.59 Monthly  
$72,070.68 - $102,643.08 Annually

OPENING DATE:  10/12/16

CLOSING DATE:  11/03/16 3:00 PM Pacific Time

POSITION DESCRIPTION:

DEFINITION
Incumbents provide polygraphic services to include interviews, interrogations, and administration of polygraph tests for criminal, internal, and pre-employment investigations for the LVMPD and other public agencies.

DISTINGUISHING CHARACTERISTICS
This is a civilian position appointed by the Sheriff, and is not subject to the competitive requirements of the Civil Service Rules of the Las Vegas Metropolitan Police Department.

SUPERVISION RECEIVED AND EXERCISED
Receives direction from supervisory and management staff. May exercise technical and functional supervision over clerical and technical staff.

ESSENTIAL FUNCTIONS
Below is a sample of the types of functions this position performs and is not intended to be a complete list:

1. Conduct polygraph exams on individuals for criminal, internal, and pre-employment investigations for the LVMPD, Clark County District Attorney's Office and other jurisdictions, as required.
2. Maintain appropriate polygraphic records, to include confidential files, logs, and reports.
3. Ensure polygraph equipment is functioning appropriately and maintain effectiveness of polygraph equipment.
4. Make presentations or lecture to law enforcement personnel regarding polygraph examinations and the law enforcement environment.
5. Prepare testimony and documentation for court proceedings and formal written reports.
6. Conduct thorough interviews and interrogations on individuals which result in legally obtained confessions.
7. Maintain appropriate scheduling of criminal polygraph exams.

MINIMUM QUALIFICATIONS / POSITION-SPECIFIC CONDITIONS:

Training, Education and Experience
A Baccalaureate degree from an accredited college or university and 1 year's experience in investigation or polygraphic examination; OR
An Associate's degree from an accredited college or university and 3 year's experience in investigation or polygraphic examination; OR
A high school diploma or GED and 5 year's experience in investigation or polygraphic examination; AND
Must have satisfactorily completion of a basic course of instruction in polygraphic techniques.

Best Candidates Will Have:

- Experience as a polygraph examiner with a law enforcement agency performing criminal, internal, and pre-employment polygraph exams.
- Additional investigative experience in a law enforcement agency.
- Attended and successfully completed a polygraph school that is accredited or recognized by the American Association of Police Polygraphists (AAPP) or the American Polygraph Association (APA).

Conditions of Employment
In addition to the General Conditions of Employment found here, the following specific conditions of employment apply to this position:

1. **Personal Appearance:** While on duty, and/or representing the Department, uniformed or otherwise, all Department employees will be neat and clean in their appearance in public. Employees are prohibited from attaching, affixing, or displaying objects, articles or jewelry on or through the nose, tongue, eyebrow or other exposed body part, except the ears for females, while on duty. Employees are prohibited from stretching or "gauging" their earlobes. All jewelry implants will not be exposed or visible while on duty. Tattoos or branding will not be exposed or visible while on duty and/or representing the Department. Such markings must be covered by clothing, and may not be covered by make-up or bandages. Tattoos or branding anywhere on the body that promote racism/discrimination, indecency, extremist or supremacist philosophies, lawlessness, violence, or contain sexually explicit material are prohibited.

SELECTION PROCESS:

**Application Filing**
Applications must be submitted online and received by the posted closing date and time. Decisions on an applicant's qualifications for this position will be made solely on the information contained in the application. *It is the candidate's responsibility to provide sufficient and detailed information in their application and resume to demonstrate possession of the minimum qualifications. Failure to do so may result in disqualification from the application screening process.*

To determine your status after submitting an employment application, you may access your account by going to https://www.governmentjobs.com/Applications/Index/lvmpd.

**Application Screening (Pass/Fail)**
Applications will be reviewed to determine those candidates who meet the minimum qualifications and are in the top group. **Those candidates in the top group will be those who possess training, education and experience most closely related to that described in the "Best Candidate Will Have" section above, and will be invited to participate in the remainder of the testing process.** Applicants will be notified of the results of the screening process via email. If you have not received your notification by 3:00 pm PST on Thursday, November 10, 2016, it is your responsibility to confirm your eligibility to test for this position by contacting the OHR representative listed below in the Inquiries Section.

**Exam Details**
Those individuals determined to be the TOP candidates from the application screening process will be invited to participate in the Practical Exam and Interview. These exams will be administered beginning on Monday, December 12, 2016.

* The LVMPD reserves the right to modify selection processes and test instruments in accordance with accepted legal, ethical, and professional standards.
Additional Selection Processes
If you successfully complete the above selection process, you will undergo a thorough background investigation which will include a polygraph and psychological exam. The background investigation takes approximately 90 to 120 days to complete. You must also meet the LVMPD Hiring Standards. LVMPD employees participate in the Department's random drug screening process. For more information on the background process, click [http://lvmpd.com/Sections/ProtectTheCity/JoinTheForce/tabid/484/Default.aspx](http://lvmpd.com/Sections/ProtectTheCity/JoinTheForce/tabid/484/Default.aspx).

ADDITIONAL INFORMATION:

Please visit the FAQs and General Conditions of Employment under Employee Standards, available on our employment site for a listing of the LVMPD's open competitive selection and employment policies, and other pertinent information. Please visit [www.protectthecity.com](http://www.protectthecity.com) for additional information pertaining to the LVMPD and its hiring process.

Inquiries
Questions regarding this selection process may be directed to:

- Toni Bolton, Human Resources Technician, (702) 828-3146, t8365b@lvmpd.com
- Dino Davis, Staff Specialist, (702) 828-3008, d6310d@lvmpd.com

Vision:
The vision of the Las Vegas Metropolitan Police Department is to be the safest community in America.

Mission:
The mission of the Las Vegas Metropolitan Police Department is to serve people, strengthen relationships and improve the quality of life.

Values:
The acronym "I CARE" is the guiding principle for each and every LVMPD member. This acronym represents the values of the Las Vegas Metropolitan Police Department: Integrity, Courage, Accountability, Respect for People, and Excellence. The values are supported by behaviors, demonstrated by the actions of members, as they live these values. All members are expected to represent the values of the LVMPD while in the workplace and off-duty.

EEO:
The LVMPD is an equal opportunity employer. All appointments to the competitive service shall be made without regard to race, color, religion, sex, age, disability, sexual orientation, national origin, genetic information, military service, or political affiliation and shall be based on merit and fitness only.

APPLICATIONS MAY BE FILED ONLINE AT:
[http://www.lvmpd.com](http://www.lvmpd.com)

400 S. Martin Luther King Blvd, Bldg B
Las Vegas, NV 89106
(702) 828-3497
jobs@lvmpd.com

Polygraph Examiner (Appointed) Supplemental Questionnaire

* 1. EXPERIENCE: Do you possess a bachelor’s degree from an accredited college or university and 1 year of experience in investigation or polygraphic examination; OR an associates degree from an accredited college or university and 3 years of experience in investigation or polygraphic examination; OR a high school diploma or GED and have 5 years of experience in investigation or polygraphic examination; AND have satisfactory completion of a basic course of instruction in polygraphic techniques?
  - [ ] Yes
  - [ ] No

* 2. AGE (CIVILIAN): Will you be 18 years old by the date of the first exam? (See posting for exam date.)
  - [ ] Yes
  - [ ] No

* 3. CITIZENSHIP (CIVILIAN): Are you a US citizen, or will you be a US citizen through naturalization or permanent resident alien of the United States without conditions on status by the date of the first
* 4. HIGH SCHOOL/GED (RECRUIT): Will you possess a high school or General Education Diploma (GED), or a homeschooling education equivalent to a complete high school education, by the date of the first exam? (See posting for exam date.)
  - Yes
  - No

* 5. BACKGROUND: Have you ever been convicted of a felony?
  - Yes
  - No

* 6. BACKGROUND: Have you ever been convicted of any crime involving domestic violence?
  - Yes
  - No

* 7. BACKGROUND: Have you ever been convicted of 2 or more Driving Under the Influence (DUI) charges?
  - Yes
  - No

* 8. BACKGROUND: Are you currently disqualified from testing with this Department due to failing the background process?
  - Yes
  - No

* 9. DEPARTMENT STATUS: Are you CURRENTLY a FULL-TIME LVMPD employee? (If a part-time employee, volunteer or intern, please answer "no.")
  - Yes
  - No

* 10. DEPARTMENT STATUS: If you are currently an LVMPD employee, what is your P#? If you are not a current employee, please indicate "N/A."

* 11. DEPARTMENT STATUS: If you ARE a current LVMPD employee, are you now on probation for the first time with the LVMPD as a Police Recruit/Officer, Corrections Recruit/Officer, Crime Scene Analyst or Dispatch Specialist Trainee? (If you are not a current LVMPD member, indicate "N/A.")
  - Yes
  - No
  - N/A

* 12. PERSONAL APPEARANCE: Do you agree to comply with the requirements that (1) if you possess any visible tattoos, brandings, and/or body piercings in areas of the body which cannot be covered by the appropriate dress required of this position, you will have them removed; and (2) if your earlobes are gauged, you will have them removed and corrected?
  - Yes
  - No
  - I do not have such markings or gaugings.
  - My tattoos, brandings and/or body piercings can be covered by the appropriate dress required for this position.

* 13. CONDITIONS (APPOINTED): I hereby acknowledge the condition(s) of employment for this position as stated in this job posting, as well as the Frequently Asked Questions (FAQs) and General Conditions of Employment available on this site, and if selected, I will accept the position offer subject to these condition(s). I also understand I will be disqualified from the selection process for violating any of these conditions.
* 14. ATTESTATION: I attest that the information contained in these Supplemental Questions is true and accurate to the best of my knowledge. I understand that any inaccurate information will be grounds for immediate disqualification from the selection process.

☐ Yes
☐ No

* 15. RECRUITING: (This question is for statistical purposes only.) How did you FIRST learn of this employment opportunity?

☐ Facebook
☐ Twitter
☐ Instagram
☐ LVAC
☐ www.lvmpd.com
☐ www.protectthecity.com
☐ Magazine or Newspaper
☐ TV or Radio
☐ Department Employee
☐ Friend or Relative
☐ Job Fair
☐ Sheriff's African American Recruitment Council
☐ Sheriff's Women's Recruitment Council AKA Women of Metro
☐ Sheriff's Hispanic Recruitment Council
☐ Sheriff's Asian Recruitment Council
☐ Sheriff's LGBTQ Recruitment Council
☐ Other

* 16. RECRUITING: (This question is for statistical purposes only.) If you first learned of this opportunity from a job fair, please specify its name. (If you did not learn of this job opportunity from a job fair, please indicate "N/A.")

* 17. RECRUITING: (This question is for statistical purposes only.) If you selected "Other" in response to how you learned about this job opportunity, please specify. (If you did not select "other," please indicate "N/A.")

* 18. RECRUITING: (This question is for statistical purposes only.) What is your highest level of education?

☐ High School
☐ Some College Courses, But No Degree
☐ Associate's Degree
☐ Bachelor's Degree
☐ Master's Degree or higher

* 19. RECRUITING: (This question is for statistical purposes only.) If you have a college degree, what was your major focus of study? (If you do not have a college degree, please indicate "N/A.")

* 20. RECRUITING: (This question is for statistical purposes only.) If you have a college degree, please state the name of the college or university from which it was attained. (If you do not have a college degree, please indicate "N/A.")
* 21. RECRUITING: (This question is for statistical purposes only.) If you have a college degree, which city and state was the college or university located in? (If you do not have a college degree, please indicate "N/A.")

* 22. RECRUITING: (This question is for statistical purposes only.) If you have a college degree, did you attain it online or in a classroom setting?

- Online
- Classroom
- I do not have a college degree.

* Required Question

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President’s Message

Patrick O’Burke

If you missed the Baltimore Conference, then you really did miss something special. The speakers were great, and we worked on some really important issues. I want to thank all who contributed to making this conference a success, as I have heard nothing but good things from those who attended. The Membership also voted on a significant change to membership requirements at the annual business meeting. Beginning in January, 2017, all new applicants to the APA will be an “Associate” for two years. The requirements for upgrading to “Member” will still include continuing education, and having completed 200 field polygraph exams. After two years, the “Associate” who has a four-year college degree can upgrade to “Member”. There is an exception for those with at least 60 college hours to take and pass a written examination in lieu of the four-year degree requirement. This is a first for the APA in actually requiring college to upgrade to “Member”, and for all new applicants to serve two years as an “Associate” before being eligible to upgrade membership. These Bylaws changes will not take effect for a few months, so if you want to upgrade your membership under the old Bylaws, please contact the National Office as soon as possible.

These changes are designed to encourage people to retain their membership, and to place value on college education. For example, if a Member drops his membership in the future, then he/she will have to start over as an “Associate” for two years before being eligible to upgrade. This places value on staying in the APA as a member. Also, the Board has been tracking the scrutiny being placed on all forensic sciences. As such, we are aware that college will become important if polygraph is to be recognized. The Board recognizes the requirements placed on polygraph by other scientific disciplines, yet grapples with the cost and time encumbered for many of our members without college degrees.

We understand the arguments that many often make regarding good examiners without college degrees. We should not view the future requirements with an internal lens about who is qualified. We should use the external lens where degrees are required and
expected for all forensic sciences by those outside of our profession. Still, I know what you are feeling. I am approaching 60 years old and have just enrolled for a Master’s degree program. You can’t teach this old dog any new tricks, but apparently you can get him to go back to school.

I have been spending the last few weeks trying to develop structure around my agenda and took some time to relax with my wife and watched the recently released movie “Deep Water Horizon”. It was a visually stunning movie, and played up a few villains in the movie as the cause of the largest oil disaster in American history. I guess we all want someone to blame when something goes tragically wrong. After the movie, I did a little research as I remembered some things that were inconsistent from when the tragedy occurred. It seems that Hollywood’s portrayal of the disaster was good, but the idea of clearly defined bad guys was not so correct.

My looking led me to the concept of the “Normalization of Deviance” as the source for many failures. This organizational dynamic was named after a scientist, Diane Vaughan, who analyzed the first space shuttle disaster and made some remarkable conclusions. Vaughan defined Normalization of Deviance as “the gradual process through which unacceptable practice or standards become acceptable. As the deviant behavior is repeated without catastrophic results, it becomes the social norm for the organization.” Vaughan’s work showed that no one person in the space shuttle disaster was the villain. Simply, that
risky incidents were observed with the booster O-rings prior to the disaster. When nothing bad occurred with those numerous incidents, it became increasingly okay to accept the deviance and normalize them. No one decision to override a single event caused the catastrophic failure. It was the cumulative effect of taking increasingly, and incrementally small, deviations from best practices that one day resulted in a catastrophe.

This would also seem applicable to polygraph with the inherent decision making required for every examiner. Every day a decision, and occasionally a principle or best practice is altered or bent. Who has not made a call from questionable charts, or included a question that was out of the norm because a client persisted? Generally, we escape harm, and actually make correct decisions after bending our own rules or best practices. What we may not understand is that this may lead to becoming a victim of our own success. Since we did so good with the last risky decision, we begin to see ourselves as exceptionally good, qualified, or an expert, leading to increasingly greater risk deviations from best practices.

I have had a fairly significant history of being able to review polygraph examinations that have often lead me to scratching my head about what had been done. Almost every one of those cases involved an experienced examiner who was not trained to do what was exhibited in the examination I was reviewing. When questions were raised, all of those examiners vigorously defended their actions as acceptable. In one recent case, an examiner even admitted that he does not quality control his examinations because of how qualified he considers himself. Oddly, these are truly very qualified and experienced examiners. I think that each of them truly believed what they were telling me was a valid justification for their actions or deviations.

Clearly being qualified and experienced is good, but if it leads to a normalization of deviation and increasing over-confidence, then these are the signals of being ripe for a catastrophe. We have perhaps the best space program in world, and yet we have had multiple tragedies. No one doubts that we have the best and most intelligent people at NASA that can be found. Do they push too hard or do they normalize deviation too much?

The good part about understanding normalizing deviation is that the solutions are rather simple. The most effective solutions seem to be; educate people about this dynamic, empower co-workers to step forward and voice criticism, and develop concepts around team
instead of individual performance. These simple solutions seem analogous to the need in the polygraph profession for quality assurance and review processes. I was tasked with looking at a quality control standard by then President Chuck Slupski more than three years ago. Every time I brought quality control up with another examiner for guidance, I was told “good luck”. I do not think it is because examiners do not know how to do these things, as there are agencies and polygraph businesses that accomplish it every day. To me, it seems to be more of a matter that there are still enough examiners who do not accept that there is a true need for quality control.

I have tasked and we are in the process of having a committee work on a quality control model policy with the potential of accomplishing implementation for the polygraph industry. This a large scale issue and there are a multitude of solutions that I hope to present them to you in my next article. It should strike a nerve with every examiner that every other forensic science has a process for quality control, except for polygraph. As a profession, we need to develop and accept solutions.

During the movie “Deep Water Horizon”, the movie producers made a point of showing that British Petroleum had flown two senior executives to the rig to present a safety award to the rig managers on the very day of the explosion. The “Deep Water Horizon” had demonstrated an impeccable record of industrial safety for more than seven years. Their own successes lead to increasingly greater risk taking and overconfidence.

It is no secret that all forensic sciences are under scrutiny. However, I believe that we have made great strides in the last five years and can meet the challenges. I also believe polygraph professionals are the best in the world for credibility assessment. It is up to us to ensure that our profession adheres to best practices and evidence based principles and we do not become over confident. Having our members participate in quality assurance review for compliance with Standards of Practice and Model Policies will bring us into alignment with other disciplines in forensic science.

I look forward to hearing from you and remind you that we always need volunteers for committee participation.
It was a true joy to attend our 51st Annual Seminar in Baltimore and see so many familiar faces and great leaders in the polygraph profession. I know I’m a tad bias because it was the seminar that took place under my watch; however, I think you will find few who would argue that this seminar was not one of the best in our history. The venue, activities and presenters were all as good as they get. Thanks to all of you who contributed in making that week so memorable. I also want to give a blanket thank you to our membership and board who helped me through my presidency. All in all, it was a successful year for the APA with many important accomplishments including the membership’s approval of a proposal that requires prospective members to have a degree or at least 60 hours of college to challenge our membership exam. Moving forward, the Association is in good hands as President O’Burke has some great ideas to raise school accreditation standards, raise the quality and credibility of our publications as well as our standards. More importantly, he has the energy and the talent to accomplish them as well as the continuity of his board and future leadership to carry out these ideas. I look forward to my service as Chairman of the Board this year and look to get more involved in continuing to elevate the quality of our annual seminar and the training we offer. As always, please call upon me if there is anything I can do for you.

Fellow Professionals,

Plans are underway for the 52nd Annual APA Seminar to be held August 27th thru September 1, 2017 in Las Vegas, Nevada. The conference will be held at the beautiful J. W. Marriott Resort Hotel.

We are anticipating a large turnout based on the quality training classes being offered, coupled with a very favorable room rate. Please make your reservations early, as we expect to sell out our allotment of rooms.

There will not be an organized Tuesday night event. Plan a night on the town of your own choosing for that evening.

Shuttles will be provided from the Marriott to the Strip at various times during
the week. The actual times and availability will be posted at the registration table during the seminar. Please remember to nominate deserving individuals for the various APA awards.

Interpretation services will again be offered in Classroom A on Monday through Friday for all classes. For those wanting to take advantage of these services, the cost will be $100 per person if you pay at the door. Those paying in advance before arriving at the seminar will be charged $50. Please take advantage of the discount by paying early so we can better project the number of headsets required. (No headset will be issued without payment.)

I would again like to thank all of our sponsors for their support.
See you in Las Vegas,

George H. Baranowski
Director

Maintaining The Integrity Of Our Profession

Many new issues now confront America and the world as a result of terrorist attacks and other related problems. The world has obviously continued to change over the years. There is one thing however that we as polygraph professionals can continue to do to make the world a better place, and that is that we must maintain the integrity of our profession. Being a truthseeker is not always an easy job and on top of that, having pressures from internal and external sources, there is temptation to yield to those pressures. Some examiners working in law enforcement or government agencies are sometimes asked or even ordered to conduct more exams in a day than are appropriate, and as a result, we sometimes might even “short change” the examinee with a poor exam. There are some examiners who have shared with me that they don’t always provide the best possible exam because they didn’t feel good, that they were tired, or they say something like they just didn’t have the right attitude on that particular day.

It is during those times that we need to remember what we were taught. I know I was always taught that the pre-test interview was one of the most important parts of a polygraph examination procedure. Cutting the pre-test interview short, increases the probability that perhaps an inappropriate question might be asked, or the examiner might have failed to establish proper psychological set, or that additional stress may have been caused to a truthful examinee, or failed to uncover useful post-test themes that may result in an admission or a confession.
It’s my thinking that if an examiner is having an unusual amount of inconclusive examinations, the problem very well could be with the development or the presentation of the comparison questions. Over the past years, a good amount of instruction has been forwarded regarding comparison question issues and selections as well as concepts that some examiners are not even familiar with, such as “Directed-Lie” comparison questions. I think that most of us believe that establishing the relevant questions is the easiest part of the examination, and that’s usually true. However, every instructor will tell you that the comparison is equally significant.

We as polygraph examiners cannot solve all the world’s problems, but we can help make this a better place to live by doing every polygraph examination as if it was the most important case we ever had, because, let’s face it, to the person we’re testing, “It is!”

The goal of the American Polygraph Association to our members is to help you be the best possible examiner that you can be. And to provide you with services that will help you attain that goal. One such service is to make available to you, useful quality training. This coming year, 2017, the APA Annual Conference will be held August 27th to September 1st, 2017 at the “fantastic” Marriot Resort Hotel, Summerlin, Nevada, which is a close suburb of Las Vegas. As I’m sure you know, a tremendous amount of work and preparation will again be met at the Summer Conference with both quality and amazement. Thank you for reading this article, and remember to “Keep Professional.”

Gary Davis
Director

Greetings from the Board of Directors. The first meeting of your current Board was held by President O’Burke following the end of the Seminar. As most of you know the membership voted to change the membership rules effective January 1, 2017. If you are currently an associate member I urge you to upgrade to Full Member before that date. President O’Burke appointed me chairman of the Membership Committee and I stand ready to help anyone with the upgrade process.

On another side of the Membership Committee, we are working very hard to enlist State and International Associations to become Affiliate Members. If you need information feel free to contact me.

As Professional Examiners, we have an obligation to maintain our skill and keep
abreast on published research. While there are some members who profess all research is flawed and what we do is nothing but smoke and mirrors, the rest of us must continue to expand our skills and knowledge. The APA is embracing Validated Testing and Evidence Based Practices. Adhering to these principals is good for the examiner, good for the consumer and good for the profession. If you want to see what your colleagues are saying and the arguments they make, visit antipolygraph.org. See what is boiling inside your profession by those claiming to be a shining a light on polygraph.

Finally I would like to congratulate the Minnesota Examiners on founding of their State Association. The first business meeting will be held on December 6th, 2016 at the Anoka County Sheriff’s Office, 13301 Hanson Blvd., Room 2112, Andover Minnesota. For more information contact Dianna Magaard, diana.magaard@state.mn.us.

**Steven Duncan**  
**Director**

Hello again, APA Members. I hope this Board Member Report finds our Members prosperous and healthy. With the Annual Workshop/Conference behind us, the Board and the National Office have been busy preparing for another year of moving the Polygraph Profession forward.

The Ethics and Grievance Committee has completed two more Cases and continues to address the few Complaints received. Our Complaint numbers are still quite low which is evidence that our Organization is comprised of Professionals doing “the right thing”. A draft of the Committee Policy was provided to the Board at the post Seminar Meeting and work continues to finalize the document soon.

As a Board Member I have been involved in several phone meetings and discussions and continue to represent the Members to the best of my ability. I have also assisted several Members with concerns and questions.

As always, I want every Member to know, I am available to assist in any way I can. If you want to talk with a Board Member, I will be glad to talk with you. I will take your ideas and / or suggestions forward even when I do not particularly agree. I am here to represent you.

If I can assist any Member, feel free to call or email me.
The 51st annual APA Training Seminar in Baltimore was a huge success! The material presented was excellent, and it’s always nice to re-connect with old friends (…and make some new ones). Many thanks to the attendee’s, classroom presenters, vendor’s and especially the APA office staff for your contributions to this year’s seminar. I can’t wait to see you all next year in Las Vegas. On a personal note, I’d like to take this opportunity to thank the membership, for supporting my candidacy for the Director 6 seat on the Board of Director’s. I am both honored and humbled by your continued support.

As Chairman of the Communications and Public Relations Committee, I am pleased to announce that the APA now has a presence on Facebook (@www.polygraph.org) and Twitter (@APA_Polygraph). Social media has moved into the mainstream as an effective mechanism of communication and it offers a platform for the free exchange of ideas. The mission of the committee is to utilize Facebook and Twitter, along with the APA website and APA Magazine to broaden our reach to the membership. Look for information about upcoming training, current events and other related topics of interest via the aforementioned sites. So, “Like Us” on Facebook and “Follow Us” on Twitter to get connected!
SECRETARY’S REPORT OF BOARD ACTIONS

Submitted by Lisa Jacocks

This report covers the time period of April 2016 through July 2016

May 17, 2016 - teleconference
• Approved the nomination of Sidney Wise Arias for retired member status
• Approved the adoption of the PCSOT Model Policy
• Approved the adoption of the PCSOT Operational Policy
• Approved the International Association of Polygraph Professionals (AIPP) as a Divisional Affiliate
• Approved the budget increase for awards
• Approved the PEAK Credibility Assessment Training Center PCSOT course
• Approved the Behavioral Measurers United Kingdom PCSOT course provider
• Approved the accreditation of the National Polygraph Academy retroactive to February 15, 2016
• Approved the accreditation of the Virginia School of Polygraph retroactive to March 27, 2016
• Approved the accreditation of the Gazit International Polygraph School retroactive to February 14, 2016

July 25, 2016 - teleconference
• Approved presenting the proposed Bylaws Amendment to the General Membership at the August 30, 2016 meeting
• Approved the National Polygraph Association (Russia) as a Divisional Affiliate member
• Approved the nomination of John T. Griffith for retired member status
• Approved the accreditation of the PEAK Credibility Assessment Training Center retroactive to April 25, 2016
• Ratified the election results
• Approved the contract addendum for Orlando 2019
• Approved the Orlando 2022 Hilton contract
Good evening and welcome to the APA’s 51st annual conference banquet. As your incoming president I hope that you are having a wonderful conference. I would first like to recognize some people that are here and formally thank them for their contributions. I would like to thank the following:

- the Maryland Polygraph Association that provided their members and support in bringing you this conference,
- our National Office staff, our Treasurer Chad Russell, and our Legal Counsel, Gordon Vaughan,
- our current Board of Directors,
- the speakers we had at our conference as their sacrifice helps make this seminar possible,
- our seminar chair, Mike Gougler,
- and the staff at the Baltimore Hilton.

I would also like to formally recognize Donnie Dutton and Barry Cushman who are departing our board, and who have both provided years of service. I would like to also recognize the following:

- the APA Past Presidents who are here,
- the President and Board Members from the American Association of Police Polygraphists,
• each of you who has taken time to attend this conference, in particular the international members who must travel great distances,

• our various vendors who provide support and assistance to the APA during our conference,

• Shirley Sturm who was my polygraph sponsor so many years ago,

• the spouses who are in attendance and support us in what we do, without them we would surely struggle in life. In particular my own wife, Hilda, who is seated here beside me.

This has been a wonderful seminar, and if you are an APA member then you know that it has been a passionate one. This is because we care about our profession. No one cares more about this profession than those who devote their life to it. It may have seemed heated and contentious, but actually it was not. It is simply an excellent example of our working together to move towards a common goal of professionalism.

It would be a mistake to think that change began in the last thirty days. It did not. Some may not realize the changes that have been happening in the last two years. The APA has had an extensive corporate review which took care of legal concerns that needed to be updated under corporate law. As a result of this legal review, we moved our old Constitution into the new APA Bylaws document. We cleaned up and clarified our Standards of Practice, and we shifted towards publishing Model Policies as a way to provide best practices for the profession. These changes were done with the understanding that our purpose as an association is to help create structure and standardization for the polygraph profession, while understanding that we are not a law enforcement or regulatory agency.

We have seen rapid and significant growth in international membership. Look around the room and you can see that we have brothers and sisters from all around the globe. As a Board we asked ourselves what is the role of the American Polygraph Association in this growth? Our answer was to create Divisional Affiliate membership for democratic professional polygraph associations who endorse our standards and best practices. When there is a need anywhere in the world, we are creating friends and advocates who support our vision of professional polygraph.

In the midst of all of these changes, I always struggle personally with the question of the correctness in what I am doing, and I look for things that help to keep me
grounded. Many of you may not know that one of the most prolific writers of English literature in the last 100 years is Rudyard Kipling. His poem “IF” is considered to be one of his best works. If you have not read it, I would urge you to look it up when you have some time.

The first stanza begins, “If you can keep your head while those around you lose theirs; if you can trust yourself when others doubt you; if you can be patient and not lose your temper; if you can handle being lied about but not lie yourself, and being hated but not hating yourself; if you do not look too good or talk too wise.”

Simply this means that the challenges we face are often difficult, and we need patience and virtue in working out change. Oftentimes this is difficult, and I hope that I have not disappointed you, or ever offended you.

The second stanza is, “If you can dream but not let those dreams cloud your reason; if you can think but still take action; if you can deal with both triumph and disaster; if you can handle it when others twist your truths into lies, or take the things you devoted your life to and turn them from broken into alive again.

Consider this when we worry about how the future will treat us, when we talk about requiring college, or being accepted as a true science, or confessions are less important. New technologies concern us when we try to see how they fit into our understanding of our core function in finding the truth, or who is telling the lies.

As we move forward this year, I have some aggressive plans I be bringing to the Board that I want to inform you as our Member about. For me these ideas did not start yesterday. I want to thank the Board, in particular those I have debated many times, as they are the ones who help shape my vision. In particular, I would thank Walt Goodson.

These plans start with a vision where we are accepted as a profession, and as a science, and where our polygraph test results matter.

- I believe this will involve the APA being actively engaged with AAFS and NIST. I will be asking the Board to appoint a new position for Science Liaison officer who will be added to support our Board.
- I will be asking the Board to join ASPA, the American Society of Specialized and Professional Accreditors, as a means of strengthening our school
accreditation committee. This gives our current efforts recognition, and will potentially allow polygraph school attendance to be readily transferred as college hours, and yes we will be asking for more college.

- I will be asking for a Model Policy on Quality Control, and that we find ways to resource those examiners who find this difficult.

- I would like to attempt to transition our current Journal and its Mission into a broader effort that conducts research on any credibility assessment, and to define the gaps in scientific knowledge that we currently have. We want to transition our Journal into one with broader oversight involving academia and the scientific world.

- We will also begin to make use of social media such as Facebook, LinkedIn and Twitter to bring you information and ideas of current issues.

Many of these are lofty goals, with many moving parts, but I believe still them to be achievable. We have a management team sitting on this table that is committed to defining where we will be in the next 50 years. We are here to serve you, and we will do our very best.

The poem “If” ends with the following, “if you do these things then the world will be yours.” This is true for our profession as we grow and mature for the are the leaders in detection of deception.

I was struck during the panel discussion during this conference by comments from two of the speakers. Jack Trimarco said he was asked if he was a good polygraph examiner, and he humbly stated that there are a lot of good polygraph examiners around. That exhibited true humility, but it further shows that polygraph as a forensic test works. I agree with Mr. Trimarco.

I was also struck by Joe Bradley’s comment. He stated that most of what you read about in recent public safety successes was accomplished by the use of polygraph. I saw, and felt, his pride in his agency’s successes, but still knows that he can’t give you the details and speak about what they did. These things are true for most of you as well. Each of you are the unsung heroes of dealing with truth and deception in making our world a better place. I want to extend my thanks to each of you for the work that you do, and the safety that you bring to our world through credibility assessment. I promise to serve you well and hope to see you in Las Vegas.
For many countries in the twentieth century the process of polygraph use generally began with purchase of the American polygraph instrument and training of examiners in the US polygraph schools (or invitation of instructors to provide training in country).

In the twenty-first century a new trend has emerged among some countries: Republic of Belarus, Republic of Armenia, Republic of Kazakhstan chose to train their examiners in the Russian Federation. Just now, when the use of polygraph in Belarus and Kazakhstan is gaining its momentum (rapidly growing), the question arose of a direct study of the US experience, establishing contacts with the American Polygraph Association and acquisition of US-manufactured polygraph instruments and equipment.

In Belarus, the use of psychophysiological polygraph examinations (further – PPE) began with the Order of State Security Committee of the Republic of Belarus (Further – KGB of RB) № 91 of August 22, 1998 “On Approval of the Procedure of the Interview with a use of Polygraph by State Security Bodies of the Republic of Belarus”. KGB of RB officer was trained in the Forensics Institute of the Bureau for Scientific-technical Support of Russia’s Federal Security Service. PPE’s were conducted with a use of Russian-manufactured Barier polygraph instrument.

On October 31, 2001, Ministry of Internal Affairs of the Republic of Belarus (further – MVD of RB) has adopted a regulation “On Approval of Operating Procedure of (for) Interview of Citizens with the Use of Polygraph by Internal Affairs Bodies”. This action initiated a beginning of implementation of polygraph examinations practices into the work routine of internal affairs agencies. Five polygraph examiners of the MVD of RB underwent training in Russia in the Main Department of Internal Affairs Of The Former Soviet Union

By Yaroslava Komissarova and Said R. Khamzin
Affairs of Krasnodar Krai (Region). Russian-manufactured polygraph instruments Barier and Rif were purchased.

In March of 2002 a Department of Psychological-Technical Support was established in the Central Office of the Ministry of Internal Affairs of the Republic of Belarus. As a result of successful actions of polygraph examiners during investigations of series of high-profile cases, polygraph examiners staff of the department grew up to nineteen officers. All Belarus regional departments of internal affairs are now using polygraph in their work.

In 2004 a non-government organization “Polygraphologist” was registered in Minsk. It united experienced examiners, mainly representatives of government agencies.

In 2010 more than 40 polygraph examiners worked in Belarus, mainly in the Ministry of Internal Affairs, KGB, border guards, customs authorities. Compared to almost 10 million country’s population, this number looks considerable. Government agencies had adopted statutory documents which regulate a use of polygraph. These documents are not significantly different from documents that were adopted in Russia.

Polygraph examiner training program, consisting of 840 hours, was developed in the Academy of the Interior Ministry of the Republic of Belarus (degree in “Psychological-Technical Support of Operational-Investigative Activities”, with qualification in “Specialist in Psychophysiological Examinations”). First students with the corresponding degree and qualification graduated in 2008.
Today polygraph examiners present their expert opinions during court hearings in courts of the Republic of Belarus. Results of polygraph examinations are taken into consideration in criminal sentencing. Sometimes courts send cases back for further examination with a requirement of polygraph testing of the accused (defendant). It is not uncommon for the defendant, his defense lawyer and even for a convicted person to request a polygraph examination on the case.

At present moment General Prosecutor’s Office of the Republic of Belarus is expressing interest in polygraph. The agency is working on the question of polygraph use in the form of forensic psychophysiological examination.


More than 500 examinations, mostly pre-employment tests for applicants to national security agencies, were conducted during the first years of polygraph use in Armenia. In 10% of cases some inconsistencies with the established requirements were detected. In-depth examinations on such result were carried out by corresponding departments. It allowed to objectively confirm the examiners opinion.

At present time Ministry of National Security use polygraph for the following purposes:

1. Staff management during enlistment and during active service in the military and in national security agencies.

2. Field work with objects of operational interest.

3. During proceedings on specific criminal cases (Ministry of National Security, Ministry of Internal Affairs and Prosecutor’s Office of Armenia).

A set of well-known “risk factors” is verified during screening examinations. They are questions about criminal background, illegal activities, unregistered weapons, drug use and sale, alcohol abuse, business relations with foreign nationals, ties with criminal groups, etc.

According to Armenian polygraph examiners, there are some national peculiarities which have a significant impact on the examination procedure. Meaning of some standard questions can be sometimes misunderstood by the examinees.

Applicants often confuse the illegal income with support, which comes from relatives from abroad. Many Armenians live outside Armenia, trying to raise money to support their families.
Therefore, examiners have to carefully explain the essence of the questions regarding concealment of illegal income.

Sometimes it is difficult to correctly diagnose a bad habit dependency. In Armenian families there is a historical tradition of alcohol drinking. Drinking a glass with your father or grandfather is a tribute to the older generation. A young man’s reaction on questions such as “Do you take alcohol in the morning?” or “Do you drink alcohol every day?” may not be true. This becomes clear during in-depth examination.

Positive experience of polygraph use by Ministry of National Security of Armenia is a good argument in favor of further expansion of polygraph practices not only into staff management, but into operational and investigative activities of law enforcement agencies of Armenia.

Use of polygraph in Kyrgyzstan started in the late 90s of the twentieth century. Finally, question of legalization of polygraph examinations has been resolved in 2010 with the adoption of the Decree of the President of Kyrgyz Republic № 146 “On Priority Measures on Implementation of Polygraph Testing System in the Public Service” (revised January 18, 2011).

Decree approved the List of government positions with a requirement for a candidate to take a polygraph test prior to the appointment, and the regulations on the test procedure.

Polygraph tests are required:

- prior to the appointment on political government positions (procedure is determined by the President of the Kyrgyz Republic);
- during competition for filling the vacancies in government administration;
- certification of government officials;
- rotation of government officials and during internal investigations (at the discretion of the head of government agency);

At present time polygraph testing is required for the employees of the State Financial Police of the Kyrgyz Republic, State Customs Administration and State Tax Service of the Government of the Kyrgyz Republic, State Secretaries of the government bodies.

In 2013 polygraph was used during certification of employees of the Accounts Chamber of the Kyrgyz Republic upon the agency request.

(upon request of the Accounts Chamber of the Kyrgyz Republic, the agency employees were tested on polygraph as part of certification).
As a base for development of the Procedure of Polygraph Testing, Kyrgyzstan legislators took a Russian draft law “On Polygraph Use”, which was not supported by the State Duma of the Federal Assembly of the Russian Federation (Russian parliament). For example, Paragraph “zh” (пункт “ж”) of the Article 1 reproduces verbatim of wording of the Russian draft law: “A result of the interview with a use of polygraph is a written report regarding the credibility of information provided by the interviewee, based on the information obtained during the interview”.

According to Paragraph “в” (пункт “в”) of the Article 1 of the Procedure, “refusal to take a test is not a proof of violation of established standards of behavior (conduct) by the interviewee and cannot be regarded as evidence of concealment of information, detected during testing”. In accordance with Paragraph 23 “polygraph test results are taken into account when the commission for certification and competition of government agency is taking a decision regarding a recommendation on assignment to a position, during employee’s evaluation, when the head of the government agency is taking a decision during internal investigation”.

In 2011, first results of polygraph use during evaluation of employees of State Tax Service has been studied (among 110 employees tested – 25% were superior officers). According to official figures, superior officers, as well as specialists, produced significant reactions on questions regarding illegal income (79% and 68% respectively) and on questions regarding influence peddling (61% and 54%).

It is not a surprise that current plans of Kyrgyzstan leadership for mass polygraph testing of government officials are a subject to criticism.

References:


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The philosopher Willard Quine observed that reasonable people believe that each of their beliefs are true, even though they know that some of them are false. You could say the same about reasonable polygraph examiners. They may believe that each of their test outcomes are correct, but know that some are wrong.

Of course, both the reasonable person and the reasonable polygraph examiner might respond that they don’t believe everything equally. They tend to have differing degrees of confidence in specific beliefs and specific test techniques. You may believe that the Yankees will win the pennant next year. But you are certainly less confident about this than in your belief that you will lose weight if you eat less chocolate. Similarly, the polygraph examiner might say that because polygraph accuracy is 80 to 90%, one can be 80 to 90% confident in a polygraph test outcome. Unfortunately, in the vast majority of situations the polygraph examiner would be wrong. Outcome confidence is related to test accuracy but is not the same as test accuracy.

The reason for the examiner’s error regarding test outcome confidence is that accuracy is a crude measure. It is an amalgam of a number of elements, perhaps the most important of which
is the base rate or prior probability of deception in the population that is being tested. Equating 80 to 90% accuracy to 80 to 90% confidence works only when exactly half of the tested population is deceptive and half is truthful – when the prior probability or base rate is uniform for deception and truth-telling. Otherwise the confidence one can have in a test outcome will be different for DI or NSR outcomes as opposed to DI or SR outcomes (to make life easier the terms NSR and SR will be used in the rest of this article).

To put the outcome confidence question simply; “If a subject fails a test, how sure can you be that they are being deceptive?” Likewise; “If they pass the test, how confident can you be that they are truthful?” Statisticians refer to this respectively as positive and negative predictive power; you or I refer to it as confidence in your calls or “outcome confidence”.

The importance of base rates

Say you carry out a large number of tests in an environment where 90% of people are truthful (clearly not a collection of politicians). After 1000 tests you decide to take stock. To start, we’ll make the simplistic assumption that you are equally accurate in detecting deception and truthfulness, and that in both cases you are right 90% of the time.

Because 90% of your subjects are truthful, 900 of the 1000 individuals you tested told the truth. But because you are wrong 10% of the time, 90 of the 900 will be wrongly called SR, with the other 810 correctly said to be NSR. The other 10% of your subjects, or 100 individuals, are lying. Again, you’re wrong 10% of the time, so 10 of them are wrongly called NSR while 90 are correct SR calls.

Adding up these test result numbers, we find that 810 + 10, or 820, are NSR. As 810 of these calls are correct, your NSR outcomes are right 99% of the time, compared with your overall test accuracy of 90%. In this setting the negative predictive power is high and you can be pretty confident in your NSR outcomes.

But when we add up the numbers for SR results they don’t look so good. Here, there are 90 + 90 or 180 SR calls, of which only 90, or 50%, are right. That’s poor positive predictive power, and you cannot be especially confident in your SR outcomes in spite of your overall 90% accuracy rate.

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1 The prior probability is the real issue and base rates can be used to estimate the prior. In many cases we don’t have a base rate, like a criminal investigation. We will, however, use the terms interchangeably in this paper.
The reality is that when most people are telling the truth you are going to make a greater number of errors (in absolute terms) for that group than you will for deceptive individuals in that group. This is because the number of truthful persons is larger than the number of deceptive persons. In the reverse situation, where the majority of people are deceptive, most errors will be made with those who are lying.

But it’s not just about prior probability or base rate

In the example above we assumed that accuracy was similar for both NSR and SR outcomes. But that is not typically the case. For a number of reasons, we may be better at detecting one or the other. There are therefore two more pieces of information that need to be taken into account. The first is the sensitivity of the test, which is the proportion of true positives that you can reasonably expect to detect. In polygraph this means detecting deceptive people – the higher the sensitivity, the more liars you catch. The second is specificity, which refers to the proportion of true negatives that you can reasonably expect to identify, in other words, the truthful people you rightly call truthful.

Some techniques have high sensitivity and low specificity, while others have the reverse. There are techniques that aim to balance sensitivity, specificity, false positive rates and false negative rates. This is why examiners should select their techniques after considering their testing goals and that technique’s estimated performance. Also, typically as one raises the sensitivity, they raise the false positive rate, which results in corresponding decreases in specificity as more innocent subjects are misclassified. Alternatively, testing methods and/or thresholds can be set to be more specific to innocent subjects, at the cost of increased false negative results. It is not a zero-sum game, all these tests are imperfect and have trade-offs for decision thresholds.

Consider this example. Say the reoffending rate of a group prisoners is 15%. You’re tasked with identifying those who are most likely to reoffend. To make it interesting you’re told that you will be paid a dollar every time you get it right, but you have to pay two dollars every time you get it wrong - some people might be reluctant to take this on. But because of your understanding of the importance of prior probabilities, you jumped at the chance as you have a strategy that will make you rich: you’ll just say that nobody is going to reoffend. If you do that, you’ll get it right 85% of the time,
and make $85 for every 100 prisoners you consider; of course, you’ll get it wrong 15% of the time, and have to pay $30 per every 100 prisoners. But that’s a profit of $55 for every 100 prisoners you review. And on top of that you’ll be able to show an 85% accuracy rate which sounds pretty good. The problem is that your technique is of little use to anyone other than yourself.

It’s clear from the above that your strategy has very high specificity – you rightly identify all those who do not reoffend, and there are no cases where you say someone will reoffend who doesn’t. But your strategy has zero sensitivity as you don’t identify any of those who do reoffend. This is not a strategy that generates much confidence in its outcomes.

Sensitivity and specificity are characteristics of the test, and don’t depend on sample size or base rates – a test that is 80% sensitive for deception should correctly identify eight out of 10, 80 out of 100, or 1,600 out of 2,000 deceptive individuals. Prior probability is irrelevant – a sensitivity of 90% is 90% regardless of the number of individuals in the sample. However, taken together with the prior probability, they provide a determination of the positive and negative predictive values of our test. In other words, if we know the sensitivity and specificity of our test and the prior probability of deception in the population we are testing, we will be able to determine how confident we can be in our test outcomes. This allows us to better advise our consumers about the test result.

David Raskin wrote about this in 1986 and 1987 (Raskin, 1986; 1987). He observed that we often have historical data on the proportion of passed tests (NSR) or failed tests (SR) in particular settings. He also knew we have estimates of test sensitivity, specificity, false positive and false negative error rates for the technique being used. Based on this, Raskin provided a way to calculate an estimate of the prior probability. Once we have that estimate, we can use it to estimate the outcome confidence in a passed test or failed test result.

But where do we get the relevant data for test sensitivity and specificity? Fortunately, we can obtain the test-related information we need from the APA meta-analytic survey (American Polygraph Association, 2011). This is probably best illustrated by way of example.

**Example 1**

A large state police agency conducts thousands of tests a year using the
DLST/ESS. This agency has found that about 65% of their screening subjects pass the test while 35% fail. The boss wants to know how likely it is that someone who has passed the test was actually truthful, and also how likely it is that those who are SR are, in fact, deceptive. In other words, he or she is asking for the negative and positive predictive values of the test result. In simple terms, he or she wants to know how confident they can be in the results of their examiners. To answer this question, we need an estimate of the prior probability of truthful and deceptive individuals in the tested population.

Fortunately, we can work out the prior probability of truthful people using the true negative rate (the specificity of the test), the false negative rate, and the proportion of applicants who passed the test. Here are the estimates for the sensitivity, specificity, false positives and false negatives for the DLST/ESS from the APA (2011) meta-analytic survey.

Sensitivity (TP) = .81  
Specificity (TN) = .75  
False Positives (FP) = .15  
False Negatives (FN) = .11

Let’s consider the proportion of people that passed the test, 65%. Some, but not all, of them are true negatives. A portion of the 65% are false negatives, who come from the deceptive population.

We can calculate the base rate of truthful individuals in our sample using these figures. For those of you interested in the math, it is a matter of subtracting the false negative rate from our NSR findings (.65 - .11), and dividing this by the true negative rate (i.e., the specificity) minus the false negative rate (.75 - .11), which results in an estimated base rate of truthful individuals of 84%. If the estimated base rate of truthful in the testing population is 84%, the estimated base rate of deceptive in the testing population is 16% (1-.84).

Thus, this state police agency is passing about 65% of their applicants, against an estimated base rate of 84% truthful individuals. And 16% are estimated to be deceptive but 35% are failing the test. Using these estimated base rates, we can work out the negative and positive predictive values of the test, that is, the confidence one can have in both NSR and SR findings:

We have estimated that 84 out of every 100 individuals in the sample are truthful and 16 are deceptive. The NPV is the correct negative results divided by all of the negative results. So of the 84 truthful people, 63 should be correct-
ly identified as truthful (84 times the TN rate of .75). There are 16 deceptive applicants per hundred, with a false negative rate of 11%, so 1.76 of the 16 Deceptive will pass the test. Thus, of the 64.76 people who pass the test, 63 are actually telling the truth and 1.76 are lying. Our outcome confidence in a passed test (or Negative Predictive Value) is 97%. The boss can be pretty confident of the NSR calls.

But the PPV is a different story. In our population, we estimate 16 out of 100 are deceptive. We expect our test to identify 81% of them, or about 13. Of the 84 truthful people we expect to incorrectly identify 15% of them as deceptive (false positive) or 13. Because the Positive Predictive Value is the number of true positives (13) divided by the total number of all positives (the SR findings) (13 + 12.6 or 25.6), our PPV is 51%. See Table 1 for the frequency distributions.

### Table 1. Contingency table for DLST/ESS with base rate of Guilt = .16, N=100

<table>
<thead>
<tr>
<th>Ground Truth</th>
<th>Pass Test</th>
<th>Fail Test</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innocent</td>
<td>63</td>
<td>12.6</td>
<td>75.6 (8.4 inconclusive)</td>
</tr>
<tr>
<td>Guilty</td>
<td>1.76</td>
<td>13</td>
<td>14.76 (1.24 inconclusive)</td>
</tr>
<tr>
<td>Totals</td>
<td>65</td>
<td>25.6</td>
<td>90.36 (9.64 inconclusive)</td>
</tr>
<tr>
<td>NPV &amp; PPV</td>
<td>.97 = NPV</td>
<td>.51 = PPV</td>
<td></td>
</tr>
</tbody>
</table>

These findings indicate that the agency using the DLST/ESS can be highly confident in its “passed test” outcomes, but it needs to be much more cautious about how “failed test” outcomes are interpreted. Deceptive individuals will almost certainly be found in the SR population, but so will many truthful people. In the case of someone who is SR, therefore, they should probably engage a valid successive hurdles approach or rely on other decision-making criteria.

**Example 2.**

For our second example we will use data from a large agency that employs a three question version of the AFMGQT, sometimes referred to as
the LEPET format. They score this test format with the federal three-position test data analysis model. That agency found that its proportion of “failed tests” is 83% while their “passed test” rate is just 17%.

Here are the estimates for the sensitivity, specificity, false positives and false negatives for the LEPET/3-position federal TDA from the APA meta-analytic survey:

Sensitivity (TP) = .76  
Specificity (TN) = .25  
False Positives (FP) = .11  
False Negatives (FN) = .06

In this example, the proportion of people that passed the test is 17%. Subtracting the false negative rate from our NSR findings (.17 - .06), and dividing this by the true negative rate (i.e., the specificity) minus the false negative rate (.25 - .06) results in an estimated base rate of truthful individuals of 58%. Conversely, the estimated prior probability for deceptive individuals is 42%. Based on our estimate that 58 out of every 100 individuals in the sample are truthful and 42 deceptive we can calculate NPV and then PPV.

To determine the NPV, we use the number of people our test will correctly identify as truthful divided by the total number of truthful outcomes. Our test identifies 25% of the actually truthful subjects correctly, or about 14.5. It will also incorrectly identify 6% of the 42 Deceptive subjects as truthful, or 2.5. So we take 14.5 divided by 14.5 plus 2.5 and we get 85% as our outcome confidence in an NSR result. Our NPV is then 85%.

Recall, 42 out of 100 of the applicants are deceptive individuals. We can expect to identify about 76% of them based on test sensitivity (true positives). We can also expect to misclassify 11% of the truthful subjects (the false positives.) The correct PPV results can be calculated by the number of deceptive subjects multiplied by the true positive rate of the test, or about 32 true deceptive. The number of truthful subjects incorrectly identified as deceptive (false positives) is the FP rate times the base rate of the truthful (.11 times 58) which is 6.4. So of those 42 deceptive results, 32 are actually deceptive and 6.4 are telling the truth (these don’t add to 42 because there is an inconclusive rate in polygraph). The PPV is the number of true positives (32) divided by the total number of SR findings (32 + 6.4 or 38.4), giving 83%.
This suggests that the agency using the LEPET/3-position federal TDA can be confident in both positive or negative test outcomes. This might seem odd given the low specificity of the test (25%) and the high proportion of SR outcomes. A closer look reveals this is due to the high Inconclusive rate for this technique (about 45%) which is heavily loaded on the truthful cases.

Finally, it should be pointed out that for simplicity we used point estimates for test sensitivity, specificity, false negative and false positive outcomes in both the examples above. Point estimates are by definition estimates, and it would have been more accurate to consider the range of outcome values that result from confidence interval estimates as this would include both worst and best case scenarios represented by the lower and upper limits for each of these measures.

### Table 2. Contingency table for LEPET/3 position with base rate of Guilt = .42

<table>
<thead>
<tr>
<th>Ground Truth</th>
<th>Pass Test</th>
<th>Fail Test</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innocent</td>
<td>14.5</td>
<td>6.4</td>
<td>20.9 (37.1 inconclusive)</td>
</tr>
<tr>
<td>Guilty</td>
<td>2.5</td>
<td>32</td>
<td>34.5 (7.5 inconclusive)</td>
</tr>
<tr>
<td>Totals</td>
<td>17</td>
<td>38.4</td>
<td>55.4 (44.6 inconclusive)</td>
</tr>
<tr>
<td>PPV &amp; NPV</td>
<td>.85</td>
<td>.83</td>
<td></td>
</tr>
</tbody>
</table>

### Conclusion.

Test accuracy is a blunt and confusing description of the effectiveness and value of test results. More useful are the positive and negative predictive values of our tests, which provide an estimate of how confident we can be in each of our test outcomes. These, in turn, are dependent on the prior probability of truth and deception in the population we are testing. A higher prevalence of deception increases the positive predictive value, or the confidence we can have in our SR findings, while decreasing the negative predictive value, that is, the confidence in our NSR findings. The reverse is experienced when the prior probability of truthful ness is higher.

Although not easily achieved it would be of great value to have more specific estimates of prior probability in
the various populations that are being tested. Although we might not ever know the exact prior probability of guilt in any testing population, we can make a mathematical estimate. Also, in these examples we relied on findings from the APA meta-analytic survey, assuming that the dimensions of criterion accuracy of our examiners are similar to those reported in the meta-analysis.

In summary, sensitivity, specificity, false positive rates, false negative rates, and prior probability of truthfulness and deception affect the confidence we can have in the outcome of our tests. Understanding this can help an agency assess the effectiveness of its testing process and assess the added value of the test result to its decision making process. Outcome Confidence is an often under-appreciated concept, but it helps us make sense of the meaning and value of our test results.

References:


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Polygraph officially began in Nigeria’s Law Enforcement circle with the return of the first set of the Economic and Financial Crimes Commission’s Polygraph examiners that trained at the American International Institute of Polygraph Stockbridge, Georgia in 2013. Since then, its practice and growth in Nigeria has seen unprecedented heights in uses ranging from Law Enforcement Pre-Employment Testing to Administrative and Criminal cases.

On the 3rd of November, 2014, a two-count charge was filed by the Federal Government of Nigeria against Rosulu Idowu Oluronke regarding the offence of “Conspiracy to obtain money by false pretenses contrary to sections 8 (a) and 1 (3) of the Advance Fee Fraud and other Fraud Related Offences Act No. 13 of 1995 as amended by Act No. 62 of 1999.” The Particulars of the offence read “Rosulu Idowu Oluronke, Fred Chijindu Ajudua, Alumile Adedeji a.k.a Ade Bendel (Still at large) one Mr. Jonathan, (Still at large) one Mr. Kenneth, (Still at large) Princess Hamabon William, (still at large) and others still at large on or about 20th November, 2004, at Lagos within the Jurisdiction of this Honorable Court, with intent to defraud conspired to Obtain Money by False Pretences from retired Lieutenant General Ishaya Rizi Bamaiyi.”

The Accused, Rosulu Idowu Oluronke, prior to her arrest and trial was a Lagos State High Court Registrar who conspired with about five (5) other individuals to defraud Lt. General Ishaya Rizi Bamayi (rtd) of the sum of three hundred and thirty thousand USD ($300,000.00) under the guise of employing the services of a high profile lawyer, Chief Afe Babalola, a Senior Advocate of Nigeria (SAN) whom she claimed had requested for a total sum of fifteen million USD($15,000,000) as his legal fees. Lt. General Bamayi was detained at the Kirikiri Maximum Prison, Lagos for an offence for which he was being tried at that time.
The Accused had denied that she neither visited the prison to discuss with Lt. General Bamayi nor did she collect the said sum of $300,000 USD from him on behalf of the high profile lawyer. However, eye witness accounts confirmed that she had indeed visited the prison on two different occasions and received the said sum on the third. The testimony of the Assistant Controller of Prisons, Garba Abdullahi also confirmed her visit to the prison.

In furtherance to the investigation, a Polygraph test was conducted to ascertain if the Accused had visited the prison and received the said sum as alleged; the Accused was Deceptive! The Polygraph Examiners Mr. Chinedu Eneanya (Primary Examiner)Primary Witness 5 and Mr. Umar Mohammed (the Quality Control Reviewer)Primary Witness 6 testified in court and tendered the Polygraph Charts and Test Results as evidence. The Examiners also educated the Court about the Polygraph; how it works and its uses. The Judge entertained the notion of applying scientific methods towards investigation.

In the final judgement on the 3rd of November, 2016, the Judge, Honourable Justice L.B Lawal Akapo, ruled that “The Defence Counsel urged the Court not to attach 'probative value to the Polygraph Examination Report (i.e, Exh 8) conducted on the Accused. The Polygraph examiners P.W. 5 & P.W. 6 testified as experts having given their qualifications and experience and that polygraph examination was carried out on the Accused to determine whether or not the representation she
made to the Investigation Authority (i.e. EFCC) is a deceit. The Accused admitted that Polygraphic examination was carried out on her by some gadget fitted to her body.

The Examiners came out with a Report in Exh “P8” that the Accused’s representation to the EFCC is a deception. As I said these Polygraphic examiners are experts going by their professional qualifications and experience.

The Law is very clear that where a party calls an expert on an issue, the adversary if he intends to challenge or dispute the opinion has a duty to call his own expert so the court can compare the two sets of experts and come to an informed decision. Where the adversary fails to call his own expert as this case, the court is bound to accept and act on the opinion put forward by the expert on record as unchallenged.

See The Supreme Court decisions in:

**OANDO NIGERIA PLC Vs. ADIJERE WEST AFRICA LIMITED**

(2013) 15 NWL.R (PT 1377) PG 374 AT 379

Aka’ahs JSC at page 393 held:

“Where a party failed to challenge the competence of an expert witness at the trial court, he cannot be heard on appeal to dispute the evidence of the witness as an expert. Where the issue of the qualification or experience of the witness was not raised and tested at all during the trial, failure to do so is sufficient to justify the admission of his evidence as an expert.”

In this case, the failure of the Accused to call expert evidence to challenge or controvert Exh “P8” makes that exhibit (i.e. p8) as well as the testimonies of P.W. 5 & 6 uncontroverted and unchallenged. I therefore believe their evidence and place reliance on Exh “P8”. I therefore find and I hold that from the testimonies of P.W. 5 and 6 couple with Exh “P8” the representation made by the Accused to the EFCC that she neither visited Kirikiri Prison nor collected $330,000.00 Three Hundred and Thirty Thousand US Dollars from General Bamaiyi are deceptions, therefore resolve the three issues against the Defendant. Before I draw the curtain, I must commend very highly the depth of industry, knowledge and erudition displayed in the Final Written Address filed by Mr. S. K. Atteh on behalf of the Prosecution. It has tremendously assisted this Court in the discharge of this duty.’

I find the Accused Guilty as charged.”

The Defendant/Accused, Rosulu Idowu Oluronke, was sentenced to ten (10) years imprisonment. As at that time she was close to her retirement from Public Service and as such lost all the benefits she would have received.
The road ahead is still very much uncharted for us, there are still a number of cases in court in which the Polygraph was tendered in evidence by Examiners from the Economic and Financial Crimes Commission (EFCC) Nigeria, so it is our hope that many more convictions would follow based on this judicial precedence.

Below are excerpts from the Nigerian Evidence Act, 2011 in reference to the provisos for the admission of Polygraph into evidence in Nigerian Courts

Nigerian Evidence Act, 2011 has provisos for ‘Expert Testimony’ (Section 68-Section 69).

Section 68. “When the court has to form an opinion upon a point of foreign law, customary law or custom or of science or art or as to identity of handwriting or finger impressions. The opinions upon that point of persons specially skilled in such foreign law, customary law or custom, or science or art, or in questions as to identity of handwriting or ‘finger impressions are admissible.

(1) Persons so specially skilled as mentioned in subsection (1) of this section are called experts.

Section 69. Where there is a question as to foreign law, the opinions of experts who in their Profession are acquainted with such law are admissible evidence of it. Though such experts may produce to the court books which they declare to be works of authority upon the foreign law in question, which books the court, having received all necessary explanations from the expert, may construe for itself.”
Stoelting’s CPSpro Plethysmograph

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1) Go to Tool → Preferences → Channels

2) Scroll down to Plethysmograph

3) Change Collect to “Enable”

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The value on the rank scoring magnitude shows which question had the greatest reaction. As you can see C3 had a greater reaction than 33 or 34. When comparing the questions, the higher the number the stronger the reaction. With our software you can highlight the areas *(shown above)* where the computer is seeing as a reaction. We at Stoelting has considered the PLE an invaluable aid for detecting deception and has been available since our analog instrument and still continues with our CPSpro, which is scientifically based.
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The ability to calculate a prior probability of deception or truth-telling for a population or sample of un-confirmed cases is a useful thing. Prior probabilities can be used to calculate the outcome confidence or level of confidence for a future case, and can also be used to estimate the outcome confidence rate that can be assumed about a sample or population of future cases. Prior probabilities can be mathematically conditioned on a test statistic or likelihood function to obtain a posterior conditional probability that can be thought of both mathematically and intuitively as a probability of deception or truth-telling.
A *prior probability (a priori)* describes our knowledge of the level of precision that can be attributed to a conclusion or decision that is made prior to a scientific test or experiment. For example: a prior probability of deception for a person undergoing polygraph examination will describe our knowledge of the probability or likelihood that the person is deceptive prior to polygraph testing. Quite obviously, if we know with certainty that a person is deceptive or truthful prior to polygraph testing then there is no need for polygraph testing. Testing is necessary only when our knowledge is insufficient (i.e., when we want to improve our knowledge about a person’s deception or truth-telling). When our knowledge is uncertain – for example: when we have uncertain knowledge about a persons’ deception or truth-telling – there is some probability that a conclusion will be correct and some corresponding or complimentary probability that a conclusion will be incorrect. Those probabilities are anchored in the quality or strength of our knowledge and the available information.

In the polygraph (credibility assessment or lie detection) testing context, our knowledge of the prior probability of deception can be the basis for an estimate of the prior probability of truth-telling. With the assumption that deception and truth-telling are part of a uniform probability space, the prior probability of truth-telling is the mathematical complement (1 – prior deception) of the prior probability of deception. For this reason, we have the option of approaching the issue of prior probability as a prior probability of truth-telling for which the mathematical compliment (1 – prior truth) is the prior probability of deception. In the polygraph context, a prior probability can be thought of as a quantified declaration or estimate of our *prior knowledge of the probability or likelihood that a person is deceptive or truthful*.

**Why should we care about prior probabilities?**

Prior probabilities can be used to calculate *posterior probabilities (a posteriori)* by combining them mathematically with the statistical results from a test or experiment using *Bayesian* statistical methods (Bayes & Price, 1763; Berger, 1985; Gelman *et al.*, 2014; Winkler, 1972). For this reason, prior probabilities are sometimes referred to as *Bayesian priors*. Bayesian inference (statistics) is used in virtually every area of scientific, social and intellectual activity today. A posterior probability is an improved statistical estimate of our *posterior knowledge* (i.e., our knowledge after a scientific...
test or experiment). Posterior probabilities are intended to improve level of precision that can be attributed to a conclusion or decision. In the polygraph context, because Bayesian inference begins with a declaration of our prior knowledge of the probability that an examinee has been deceptive or truthful, the statistical results from Bayesian analysis can be interpreted as a posterior probability of deception or truth-telling.

Bayesian inference differs from frequentist inference in an important way. Frequentist inference emerged as an attempt to understand and quantify measurement error and has been subsequently applied to problems of classification and prediction¹. Bayesian inference is more directly intended to quantify classification error. Whereas frequentist inference seems to rely on the stark and unrealistic premise that we know nothing prior to the analysis of data from a scientific test or experiment, Bayesian inference asserts that we do in fact have some imperfect prior knowledge and requires that we attempt to quantify that knowledge in the form of a prior probability, sometimes referred to more simply as a prior.

Although it may be tempting to think of frequentist inference and Bayesian inference as separate and distinct, it can be useful to combine the two statistical paradigms. Cohen (1994) showed a simple method for combining a prior probability estimate with frequentist statistics. In the polygraph context, statistical test results can be combined mathematically with the prior probability to update or improve the precision of the posterior probability estimate. This process is sometimes thought of as Bayesian updating.

A probability of deception or truth-telling has some useful appeal compared to statistical metrics obtained from frequentist statistical methods. Compared to the seemingly obscure and counterintuitive probability statistics offered by frequentist inference, a probability of deception or probability of truth-telling can achieve the scientific goal of probabilistic quantification of conclusions about deception and truth-telling with simpler intuition and more obvious usefulness to more persons with less formal statistical training.

Where do prior probabilities come from?

Prior probability estimates can come from any source of knowledge or information upon which we are will-

¹ Frequentist inference is the basis of the scientific tradition of null-hypothesis significance testing, which compares a probability result with a null hypothesis that characteristically assumes there is no effect.
ing to rely. A common solution when there is very little prior information is to assume a uniform prior. That is, we assign equal prior probability values to all possible conclusions. When there are two possible conclusions, such as deception or truth-telling, the result will be that each is assigned a prior probability of .5 or 50%.

When there is reasonable information suggesting the probability or likelihood of deception is greater than it is for truth-telling, then it will be incorrect to use a uniform prior. In this case it will be correct to select the most realistic prior probability that can be determined based on the available prior knowledge and evidence. Similarly, if there is reasonable evidence or information suggesting a greater probability of truth-telling, then it will incorrect to calculate a posterior probability using a uniform prior. In this case it will be correct to use a prior probability estimate that reflects a greater chance of truth-telling than deception.

One source of prior knowledge is experience. Data can be obtained from a population or sample and analyzed to determine the proportion of cases for criterion categories such as deception or truth-telling. This is referred to as a base rate or incidence rate. The purpose of the base rate or incidence rate is to serve as a prior probability estimate for the classification of new cases. Prior probability information can then combined with a statistical result from a test or experiment to calculate a posterior probability. Quite often, population and sampling data is difficult to obtain and there are often additional difficulties in adequately determining the category or criterion state of each case in a population or sample.

Knowledge of case status will be required for the cases in a population or sample if we are to use that data as a prior probability estimate. One solution available today, that was not available in decades past, is to use computers to simulate the probability results of a mathematical model using Monte Carlo methods. In this way we can study a problem and solution without having complete access to all the data. By themselves, computer simulation studies may not be sufficient to provide fully satisfactory answers to scientific questions. But coupled with other types of research such as longitudinal surveys, controlled experiments, clinical trials, and meta-analysis, Monte Carlo methods are a powerful tools for studying scientific questions. One advantage of the Monte Carlo approach is the capability to employ both random assignment while achieving strong knowledge of
case status. Another important advantage of simulation studies in Bayesian analytics is the ability to more easily study the level of precision that can be obtained from conclusions based on a range of possible prior probabilities – a prior probability distribution.

**How to calculate a prior probability estimate from a population with unknown case status**

Scientists, statisticians and data analysts have been calculating and working with prior probabilities for some time. Calculation of a prior probability estimate from available data on deceptive and truthful test results, requires, in addition to knowledge about the proportion of observed deceptive and truthful test results, some existing knowledge of test sensitivity (SENS), specificity (SPEC), false-positive rate (FPR) and false-negative rate (FNR). Raskin (1986; 1987) first described how to use Bayesian methods to calculate a point estimate of the proportion of a sample or population that is actually deceptive or actually truthful using two equations shown below:

\[
P_D = A_g * P_g + E_i * P_i \quad \text{and} \quad P_T = A_i * P_i + E_g * P_g
\]

Where:

\[
P_D = \text{proportion of deceptive results in the available sample data}
\]

\[
P_T = \text{proportion of truthful results in the available sample data}
\]

\[
A_g = \text{accuracy with actually deceptive (guilty) cases or test sensitivity (SENS)}
\]

\[
A_i = \text{accuracy with actually truthful (innocent) cases or test specificity (SPEC)}
\]

\[
E_g = \text{error rate with actually deceptive cases or false negative rate (FNR)}
\]

\[
E_i = \text{error rate with actually truthful cases or false positive rate (FPR)}
\]

Our objective is to solve algebraically for two values, \(P_g\) and \(P_i\), where:

\[
P_g = \text{proportion of actually deceptive cases in the available sample data}
\]

\[
P_i = \text{proportion of actually truthful cases in the available sample data}
\]

To make matters easier, we only need to solve one equation because \(P_g = 1 - P_i\) and \(P_i = 1 - P_g\). Then, when we know \(P_g\) and \(P_i\), we can use these two values to calculate the outcome confidence or confidence level (i.e., the probability of deception or probability of truth-telling) for the result of a future case.

To start, using the formula above, on the left side of the \(=\) put the known proportion of deceptive cases. First we need to calculate \(P_g\) beginning with \(P_D\).
To complete the publication record we will show the algebraic rearrangement to compute prior probabilities from the published record:

\[ P_D = (A_G \times P_G) + (E_i \times (1 - P_G)) \]

On the right side we put the known values for \( A_G \) (SENS) and \( E_i \) (FPR). On the left side we have the known value \( P_D \). On the right side we have a mixture of known values \( A_G \) and \( E_i \) along with the unknown value \( P_G \). Our objective is to solve this equation so that the unknown value \( P_G \) is alone on one side of the equation.

First we re-write in the expanded form.

\[ P_D = (A_G \times P_G) + ((E_i \times 1) + ((E_i \times -1) \times P_G)) \]

Next we simplify a little bit.

\[ P_D = (A_G \times P_G) + E_i + (-E_i \times P_G) \]

Then combine like terms.

\[ P_D = (A_G \times P_G) + (-E_i \times P_G) + E_i \]

Rearrange a little bit more.

\[ P_D = E_i + (A_G + -E_i) \times P_G \]

Then proceed to solve for \( P_G \).

\[ P_D - E_i = E_i + (A_G + -E_i) \times P_G - E_i \]

Combine like terms again.

\[ P_D - E_i = (A_G + -E_i) \times P_G \]

Rearrange again.

\[ (P_D - E_i) / (A_G + -E_i) = ((A_G + -E_i) \times P_G) / (A_G + -E_i) \]

Combined like terms again and we have solve for \( P_G \) on the right side.

\[ (P_D - E_i) / (A_G + -E_i) = P_G \]

Rearranged so that \( P_G \) is on the left side.

\[ P_G = (P_D - E_i) / (A_G + -E_i) \]

Then simplify further. At this point the unknown value \( P_G \) is the only value on the left side, and all values \( P_D \), \( E_i \), and \( A_G \) on the right side are known values.

\[ P_G = (P_D - E_i) / (A_G - E_i) \]

Now we have a formulate to calculate a point estimate of the base rate or prior probability of deception – the proportion of a population or sample that is actually deceptive – using known information. We can simply plug in our known values for \( A_G \), \( E_i \), and the proportion \( P_D \) of deceptive cases in the available data. We also know that the base rate or prior probability of
truth-telling is the compliment of the prior probability of deception.

**Summary**

The ability to calculate a prior probability of deception or truth-telling for a population or sample of unconfirmed cases is a useful thing. Prior probabilities can be used to perform Bayesian calculations of the outcome confidence or level of confidence for a future case. Prior probabilities can also be used to estimate the outcome confidence rate that can be assumed about a sample or population of future cases. The goal of a scientific test or experiment is to improve our knowledge and information and in doing so improve our decision making. A scientific test or experiment is useful only if it improves the precision of our prior knowledge and conclusions. Bayesian analysis accomplishes this by using a statistical test result as a likelihood function to calculate a conditional probability of deception or truth-telling. That is, the prior probability is conditioned on the test statistic. The resulting statistic can be thought of both mathematically and intuitively as a probability of deception or truth-telling.

Like all probabilistic knowledge, prior knowledge is inherently imperfect and by itself often insufficient as a basis for conclusion. Of course, better prior knowledge can lead to better posterior precision. One way to improve our prior knowledge and prior probability estimates is to reduce the degree of error or imperfection associated with a prior probability estimate. Another way to improve the effectiveness of a prior probability estimate is to express a prior probability as a range of values – a prior probability distribution. Prior probabilities expressed as point estimates (i.e., a single numerical value) are virtually always incorrect. Prior probability distributions can be expressed in any level of detailed information that is available to us, including values for the lower limit, upper limit, central tendency, and can take the form of a probability distribution such as the Gaussian/normal distribution, Poisson, Exponential, Binomial, Multinomial or other probability distribution. That will have to be the subject of another paper.

Field practitioners will generally not involvement themselves in the mathematical calculations themselves, and will often rely on published probability reference tables to calculate statistical results. A more contemporary solution will be to develop computer software applications that will quickly and accurately compute all required calculation and format the results in a well organized printable and readable out-
put. As always, persons interested in studying the details of the polygraph test or any scientific test, and those wishing to claim expertise in the analysis and interpretation of test data will want to familiarize themselves with the actual mathematical and algebraic computations. Professionals whose primary interest is in the area of field practice, application and the use of scientific tests to develop and understand available information may want to minimally become familiar with the conceptual vocabulary of scientific testing, probability and Bayesian analytic methods.

References:


The polygraph test was used for the first time in Panama after the death of Panamanian ex-president José Antonio Remón Cantera on January 2, 1955. While many investigations were performed the case surrounding his death has yet to be solved.

Russell Chatham, an American expert came to Panama to test Rodolfo Saint Malo and Jose Ramon Guizado’s son, who were the main suspects of his assassination. Worried by the inconsistencies of the investigations process Chatham determined limited collaboration from Panamanian authorities. Chatham communicated confidentially to the US ambassador in Panama, Selden Chapin, the polygraph test results confirmed the suspects were telling the truth and they were innocent. It is known the polygraph instruments used for these tests have not been used since then.

In late 1970’s 1980, the polygraph was used by the South Group of Intelligence and Counterintelligence Services, located in Panama at the military bases, where American polygraph examiners from the Federal Bureau of Investigations (FBI) were sent to perform very secret investigations in Panamanian land. During this time the polygraph was not used for criminal cases and Panamanian personnel were not trained to use the polygraph.

The polygraph was used privately for the first time in early 1980’s. An American polygraph examiner that was not part of the army started to perform test in Panama for banks, insurance companies and transnational’s that established in the country.

Mr. Sidney Wise Arias, who is considered the polygraph pioneer in Panama, was trained at Miami Polygraph Institute in 1981. He was part of the American Army and is founder member of Latin American Polygraph As-
sociation (ALP) he was also one of the first Panamanian members to join the American Polygraph Association.

Arias, retired from the polygraph profession due to health conditions after 33 years of career, he wrote a book, several articles, was a certified instructor, researcher and member of multiple polygraph associations internationally.

During the dictatorship period in Panama, from 1983 to 1989, the use of polygraph expanded; it was secretly used to investigate narcotics, and infiltration cases. In November 1989 there was a bomb threat in the country; the concern regarding this explosive had an unexpected end. A competent group of polygraph examiners arrived to Panama to test the informant to reach the conclusion that it was a fraud.

After the US invasion to Panama, in early 1990’s there were polygraph examiners from different countries working in conjunction with the US government that remained in the country.

In 1996 there was an awakening interest from Panamanian authorities and society in general to use the polygraph. Erin Jose Milanes Silen, from Puerto Rico was the first one to start practicing polygraph in Panama. Milanes a lawyer, polygraph examiner and criminologist performed tests for multiple national and international organizations. The same year Panamanian Marco A. Baruco Estribi, being part of Panama National Police, was trained in Polygraph in Texas, USA. When he came back left the organization and started to perform polygraph tests in the private field. He was the first Panamanian to start a private polygraph company in the country. Nowadays is
member of the Latin American Polygraph Association and he was president from 2012 to 2013.

At that time, Mr. Gerardo Solis, a lawyer and professor of law, became a public figure by working at the Election Prosecutor Office of Republic of Panama (1999-2009). He was part of the polygraph department, where he was in charge of investigating behaviors against the internal policies; this created an institution with more transparency.

During that time, Mr. Manuel Arguello Nicaraguan, worked alongside with American forces for several years throughout the war between Nicaragua and El Salvador. At present he works in private sector and is Director of Polygraph Department for the Election Prosecution Office.

Puerto Rican Mr. Williams Milanes joined the Polygraph profession and established his company in Panama in 1998.

At the same time, Technical Judicial Police (PTJ), before Direction of Judicial Investigations (DIJ), had just one polygraph examiner, Panamanian inspector Daniel Romer, he was trained in Florida and was the first Panamanian to use an analog polygraph in our country. He stayed within the organization for a year and left in 2007; after leaving he worked in the polygraph field independently.

The Technical Judicial Police had one instrument but it was not used frequently, however due to multiple requests from different authorities the organization arranged a location for polygraph tests, to be used in some relevant cases at the time. Soon government and private organizations started requesting polygraph services to investigate corruption and theft cases.

By 1999 an Assistant Prosecutor accused the Technical Judicial Police of using the polygraph test illegally and indiscriminately, he warned would start an investigation to prosecute officials that were involved in the use of polygraph instrument. Mr. Gerardo Solis concerned for the public opinion of Panamanian society regarding the use of polygraph in Panama decided to write an essay about the polygraph use in Panamanian Administration, titled “Polygraph in Panama” with the purpose of proving the use of polygraph was legal in Panama in 2000.

Officials of Technical Judicial Police were accused of corruption and inappropriate behavior in 2001. Field officials from the capital city and the rest of the country were submitted to a polygraph test for their alleged connection with criminal groups dedicated to theft with violence, kidnapping and drug theft.

In October 2002 a respondent requested to take a polygraph test to prove
his innocence for the first time in the Panamanian legal system. He was a Colombian citizen Clacy Watson Herrera, who by the time of his request had been detained for 17 months already and was serving sentence for 6 years charged with drug dealing. Newspaper registers of that time show the Criminal Court XV ordered the execution of the polygraph test. Watson failed the test and later refused to undergo any other kind of test.

Since 2002 the Intelligence Department of Panama, directed by Public Safety and National Defense Council (CSPDN) along with the Presidency Ministry, sent several officers to get training in Mexico through the Central American Countries Agreement program offered by the Investigation and National Security Center (CISEN). The goal was to train the new officers that would be working for Government Security.

The first polygraph examiner training took place in Panama City in 2005, offered by International Polygraph Training Center S.A. (IPTC) organization directed by Mexican Ms. Margarita Prado de Lebrija, the organization established in Panama that year, offering their services to private and government sector. As yet 7 polygraph examiner classes have graduated, training local and foreign professionals. Furthermore, IPTC is the first company to sell polygraph instruments in Panama, being Lafayette Instrument repre-sentatives.

In that same year, 2005, BM Investigations Inc. joined the market, lead by American Mr. Brett Mikkelson, an US Army interrogator and private investigator. Realizing how difficult was to find a polygraph examiner in our country; he decided to travel to California to study at the Backster School in November 2004.

The Office of Professional Liability, an independent internal investigation organization responsible to make agents accountable for their behavior, was incorporated to the Technical Judicial Police and National Police of Panama (PNP) in 2006. They have administrative power to start internal investigations and legal processes. Due to increasing staffing demand, along with the need to train investigators to perform polygraph tests, the National Police received training in United States, Colombia and Panama creating 18 units. It is well known that some officers that were trained at the time nowadays occupy different positions that are not polygraph related.

The polygraph was used to investigate the poisoning case of Franklin Mauricio Brewster Chase, chief of the Special Unit of Sensitive Investigations of the Technical Judicial Police. His co-workers, detectives Brown, Velez and Francis poisoned him on July 3, 2006. To justify their detention they were polygraph tested by an FBI agent on Sep-
tember 1, the results were deception indicated. The investigators eliminated the possibility that Brewster’s wife was involved when she passed the polygraph test. The poison was added to Brewster’s lunch while it was stored in the refrigerator at the common area of the unit.

The use of polygraph in the country increased during this period due to a lot of politicians, public workers and businessmen deciding to take a polygraph test to prove their veracity. One of the famous cases was the Sub Commissioner Mauricio Nelson in 2010. Additionally several important figures were challenged in public media to take a polygraph test to prove their innocence regarding multiple issues and most of them have not been completed yet.

Technology has made its appearance in polygraph history in Panama as well. In May 2014, Eye Scan SA introduced the first Eye Detection station to the country with the former FBI agent David Wattley as the company owner. Nowadays there are more companies that have this technology to detect deception.

In September 19 2015, Ms. Ana Florez president of Psychology Association of Panama called to a meeting for all the polygraph examiners in Panama at the Latin University of Panama to create the first Association of Polygraph Examiners in Panama. Panamanian Mr. Fabricio Gonzalez Gaitan was appointed as the president of the provisional board of directors and a statute was created to formalize foundation of the association. Carlos Herrera, a lawyer and a polygraph examiner, assisted to submit the necessary paperwork to the Ministry of Panama Government to obtain a timely legal status.

The polygraph profession in Panama has a continuous development due to polygraph examiners that show great professionalism while practicing polygraph with the latest techniques and quality standards required to perform tests. Today there are near 60 polygraph examiners in the country working in private organizations, public institutions, and independently.

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Por. Sidney Wise Arias.

http://www.sekura.net/es/documentos/bios/Bio_Sidney_Arias_SP.pdf

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The analytic theory of polygraph testing is that greater changes in physiological activity are loaded at different types of test stimuli as a function of deception and truth-telling in response to relevant target stimuli.
Stimulus and response: this is the basic idea underneath a scientific test. For example: a stimulus in a lie detection or credibility assessment test such as the polygraph test is a question that describes something for which the subject can be either truthful or deceptive. Although sometimes procedurally complex, using a scientific test is a conceptually simple matter: present the stimulus, then observe and record the response. Complete several stimulus and response trials. Aggregate the response data, and compare the result to a probability reference model. Probability models can be empirical models, calculated from observed data, and can also be theoretical models, calculated from information subject to mathematical and logical proof – the strongest form of scientific information.

Scientific terms: hypotheses, theories, laws of science

Scientific ideas begin as questions about how reality, the universe, works. Suggested answers or explanations to questions about reality and the universe are referred to as hypotheses, and these must be subject to testing and investigation before they are accepted. When an idea or explanation is inconsistent with reality (i.e., inconsistent with evidence) it is referred to as a false-hypothesis and must be discarded. Continued reliance upon a false hypothesis as if it is an adequate scientific explanation for reality has been referred to as pseudoscience [See Shermer (2011) for more information about pseudoscience.] False-hypothesis must be discarded and replaced with ideas that can be reconciled with evidence from reality.

When an idea cannot be falsified after reasonable attempts to do so – when an idea is not inconsistent with available evidence – it then is accepted as a working theory. Scientific theories are hypotheses that are supported by the available evidence. A theory will describe what we can reasonably say, based on the available evidence, about how reality and the universe works. A theory is a model, but a theory itself is neither reality nor the universe. To paraphrase the physicist Neils Bohr “It is wrong to think of the task of [science] as the study of nature. [Science] is the study of what we can say about nature” (Peterson, 1963). A theory is simply an abstract representation – an attempt to understand and explain – reality and the universe, constructed in verbal language or other structured and replicable form of expression and communication.

A good theory will account for the broadest range of evidence with the simplest explanation, referred to as
parsimonious, and will be consistent with other scientific knowledge and theories. Scientific ideas are never actually proven, they are merely supported by available evidence. To the extent that there is always more to learn, scientists will continue to apply and test our theories with increasingly available evidence. When a scientist or scientific thinker discovers that theory or idea cannot be reconciled with some new evidence or other scientific ideas then some modification or replacement of the theory is necessary. To the extent that all theories and all models can only incompletely describe reality and the universe, it has become an aphorism in science that “All models are wrong but some are useful” (Box, 1976). All ideas and all assertions about reality are ultimately an approximation.

A general principle of science is that we may never know everything about the universe, and so the task of learning and increasing our knowledge will be forever ongoing. The purpose of a scientific investigation or scientific experiment is to test a hypothesis against a basis of evidence. A fundamental requirement of any scientific idea or explanation is that it is falsifiable (Popper, 1959). That is, there exists some means to test a scientific idea so that we can reject it if it is incorrect.

**Rationale for scientific testing**

The purpose of a scientific test is to quantify some interesting phenomena that cannot be subject to perfect deterministic observation – for which the outcome is not influenced by human behavior, and not affected by random variation and is therefore always exactly the same – and also cannot be subject to physical measurement – subject only to measurement error – which would require both a physical substance and a well defined unit of measurement. While much of science can be thought of as attempting to explain or understand the outcome of some process, scientific tests, including the polygraph test, are often concerned with classification, and prediction.

Classification refers to the determination of a class or category to which a case can be assigned. Prediction can refer to the expected likelihood that a conclusion about a single case will concur with other information from reality and the universe, or to the likelihood that concurrent information is available in reality and the universe. Prediction can also refer to an expected proportion of possible cases for which we can expect to achieve a correct classification.

Scientific tests, because they are in-
tended to quantify phenomena for which there is no physical substance. Tests accomplish the task of quantification through the measurement and combination of proxy data, for which there is a known statistical relationship between the data and the criterion of interest. Scientific tests are based on scientific theories. Without a theory it is difficult or impossible to understand and evaluate the strengths and limitation of a test and also difficulty to quantify the level of effectiveness (i.e., range or confidence interval) that can be reasonably expected. And it is similarly difficult or impossible to quantify the range of error that can be reasonably anticipated when a test is applied to reality.

Although direct control over outcomes cannot often be achieved, the ability to make better outcome predictions will enable us to weigh the occurrence of correct decisions with the economic costs associated with correct decision errors, and ultimately increase the effectiveness at decision-making and the achievement of practical and operational goals and objectives. Professionals who use scientific tests and those who use scientific test results are expected to learn to communicate and think probabilistically and to make use of probabilistic information.

An analytic theory for polygraph testing

The analytic theory of polygraph testing is that greater changes in physiological activity are loaded at different types of test stimuli as a function of deception and truth-telling in response to relevant target stimuli. An advantage of this analytic theory is that it does not depend on mind-reading or guessing about the un-falsifiable and un-verifiable subjective emotional experience of the examinee. Instead, it describes what we expect to observe in the recorded data. This analytic theory does not depend on metaphoric language such as “strong reaction,” for which there is no physical strength involved. The phrase “greater changes in physi-
iological activity” is a factual and descriptive statement that begins with an assumption that physiological activity is an ongoing process for which changes will occur in response to test stimuli.

According to this analytic theory, interpretation of changes in physiological activity is a matter partitioning the observable, measurable, and quantifiable variation in the recorded data for different types of test stimuli. Most importantly, this analytic theory for polygraph testing does not depend on the false hypothesis that responses are driven by fear, or any other single emotion, or any single psychological process. Nor does it depend on the false premise that different emotions will manifest in physiological response differences that can be observed or recorded by field polygraph recording instrumentation.

Implicit in this analytic theory for polygraph testing is the idea that human physiology is active, and that presentation of the test stimuli can be expected to induce observable changes in activity. The issue of interest to the polygraph is whether the changes in physiological activity are systematically (i.e., non-randomly) loaded for the different types of stimuli. Interpretation of systematic loading is a matter of whether the numerically quantified data do or do not achieve a statistically significant level. In this way the test data, test scores, and the reproducible analytic test results serve as a basis of evidence to support a scientific conclusion about deception or truth-telling (Nelson, 2015).

An analytic theory for polygraph testing does not depend on unquantified subjective or impressionistic judgments about observed patterns or activity signatures in the plotted or displayed waveform for the recorded time-series data. The pattern of interest during the analysis of recorded polygraph data is not the graphical shape of the plotted waveforms after signal processing. Instead the pattern of interest is the loading of responses for different types of test stimuli. This pattern can be observed in the recorded physiological data only when a sufficient volume of data is recorded. The analytic theory of the polygraph test is a falsifiable empirical theory: analysis of field and laboratory sampling data will show that greater changes in physiological activity either are or are not loaded at different types of test stimuli as a function of deception or truth-telling in response to the test target stimuli.

Finally, this analytic theory for polygraph testing does not attempt to fully account for or describe the under-
lying psychological or physiological processes that explain or account for the recorded signals. Without doubt there are interesting questions about the cognitive and emotional and behavioral basis for observable and recordable physiological responses to test stimuli, just as there are important questions about the exact details of the physiological mechanisms that are captured by the recording sensors themselves, and difficult questions about the correlation of recorded signals with the criterion of interest and covariance of sensor data with data from all of the other sensors. These complex and difficult questions are best addressed incrementally, else progress towards a complete systematic theory will be potentially handicapped by wasted time and attention on hypotheses that are not consistent with reality.

Contrast with earlier hypotheses

In years past, if we were to ask polygraph field practitioners to explain the theory of the polygraph and we would likely have heard discussion about fear, threat and consequences as the basis of responses to relevant and comparison stimuli. It was also hypothesized, though incorrectly, that different emotions might manifest differently in recordable physiological activity.

The fear hypothesis was first suggested at a time when the use of statistical models and analytic methodologies was beyond the skill set or imagination of most polygraph field practitioners. At that time, polygraph data was recorded by tracing ink onto a moving paper – where the ink on the paper was the actual data. This is in contrast to the polygraph instrument of today, for which the displayed data is recorded in a time-series (i.e., a series of successive recorded samples) of digital and numerical values that can be subject to signal processing, feature extraction, statistical analysis, and graphical display. The idea of fear as a theoretical explanation for polygraph responses was first suggested at a time when numerical scoring was regarded as simply a teaching tool, a crutch, for practitioners who lacked sufficient experience and expert judgment to render decisions by merely looking at the recorded data.

Few people could have correctly anticipated the importance and implications of what had been demonstrated by Meehl (1954) about clinical and statistical conclusions in the mid-20th century. Instead, it seems to have been expected that polygraph field practitioners with sufficient experience and expertise would not relay on numerical scoring and would instead simply look at the data to achieve conclu-
sion based on visual analysis alone. In the absence of attention to statistical analysis and probabilistic conclusions, the emphasis in the polygraph profession was solely on attempting to explain the psychological processes or mechanism that underlie observed differences in physiological reaction to different types of polygraph test stimuli. In contrast, and analytic theory for the polygraph attempts to explain the data and what the data can tell us about whether practical conclusions of deception or truth-telling are likely to concur with reality.

The fear and threat hypothesis has been referred to as the idea of psychological set within the polygraph profession, though it has been pointed out by Krapohl (2001), Honts (2000) along with Handler and Nelson (2007) and Senter, Weatherman, Krapohl and Horvath (2010) that the term is not used in the field of psychology in the same way as it is in the polygraph profession and is without scientific support as an explanation for polygraph responses. The notion that fear is a basis of observable and recordable physiological activity is inconsistent with published evidence showing that polygraph techniques that make use of directed-lie-comparison (DLC) questions (Department of Defense, 1995a, 1995b; Honts & Raskin, 1988; Horowitz, Kircher, Honts & Raskin, 1997; Prado, Grajales & Nelson, 2015a, 2015b) can provide criterion accuracy rates that may equal or exceed that of probable-lie comparison (PLC; Reid, 1947; Summers, 1939) question formats (American Polygraph Association, 2011; Horowitz, Kircher, Honts, & Raskin, 1997).

A corollary to the fear hypothesis would be that the polygraph test might not be effective with psychopathic persons, for whom some evidence has shown have low levels of fear conditioning (Birbaumer et al., 2005; Veit et al., 2013). Fear conditioning may be related to the ability to learn from one’s consequences and subsequently modify future behavioral choices. Evidence again does not support the fear hypothesis, as the polygraph test has shown to be effective with psychopathic persons at rates similar to non-psychopathic persons (Balloun & Holmes, 1979; Barland & Raskin, 1975; Patrick & Iacono, 1989; Raskin & Hare, 1978), despite their differences in the ways they subjectively experience emotions such as fear.

Taken together, similar levels of polygraph effectiveness with psychopathic and non-psychopathic persons, the effectiveness of DLC polygraph techniques, and the fact that polygraph instrumentation is known to be incapable of discriminating between basic
emotions such as fear, anger, disgust, sadness and happiness (see Kahn, Nelson, & Handler, 2009 for a discussion) and also incapable of discriminating the reason for an emotion (e.g. fear of the examiner or fear of consequences for a behavior) all indicate that the fear hypothesis, though perhaps at one time interesting and useful, is in need of wholesale replacement as an explanation for polygraph responses.

The fear hypothesis becomes even more problematic when considering that the consequences for an innocent/truthful person whose polygraph test results appear deceptive (i.e., a false-positive error) are generally identical to the consequences for a guilty/deceptive person who produces a deceptive polygraph result. Instead of attempting to guess about the subjective experience of the examinee, a satisfactory analytic theory for the 21st century polygraph test will describe what we can observe to observe quantitatively and probabilistically in the recorded polygraph data when a person is deceptive or truthful.

The analytic theory described herein can be applied and tested, and has been, for both PLC and DLC techniques, both types of which have been shown to produce similar effect sizes. It is also consistent with the more general concept of salience, as suggested by Handler and Nelson (2007) and differential salience as applied to the polygraph test by Senter, Wehnerman, Krapohl, and Horvath (2010). It can also be generalized to other types of polygraph tests such as the concealed information test (also described as a guilty knowledge test in some literature) and even the relevant-irrelevant test. All that is necessary is to develop suitable statistical reference model to quantify the probabilistic values associated with different possible conclusions about different types of test stimuli. For example, in the concealed information test the types of stimuli can be thought of as the investigation target stimulus and all other stimuli. The analytic theory states that greater changes in physiological activity will be loaded at different types of stimuli as a function of concealed information in response to the investigation target stimuli. Because responses to concealed information test stimuli are encoded as 0, 1, or 2, for several trials (referred to as keys), the reference model for the concealed information test is a multinomial distribution [See Handler, Nelson & Kuczek, 2015 for a discussion.]

**Summary and conclusion**

The future of the polygraph test and the polygraph profession depends in part on the identification of a hypothe-
thesis or theory that is consistent with the requirements of science and available scientific evidence. The analytic theory proposed herein meets those requirements, and does so without introducing new ideas and without introducing necessary changes to testing methodologies. Scientific studies have for decades supported the validity of this theory (American Polygraph Association, 2011; Honts & Peterson, 1997; National Research Council, 2003; Office of Technology Assessment, 1983; Senter et al., 2010). [See Nelson and Handler, (2013) for a brief history of scientific reviews of polygraph test accuracy].

The analytic theory of polygraph testing describes the data that field examiners can work with numerically, statistically and analytically. It is one which field examiners and scientists have been using for decades time whenever they numerically score and quantify polygraph test results. The analytic theory for polygraph testing is falsifiable. Perhaps most important, it is consistent with decades of scientific research on the effectiveness of the polygraph test at discriminating deception and truth-telling by evaluating differences in the loading of greater changes in physiological activity in response to different types of test stimuli.

Without doubt there are deep and important questions that remain to be explored concerning the underlying physiological responses to polygraph stimuli, along with perhaps even deeper and more difficult questions about the subjective cognitive and emotional experiences of the examine, the degree to which these are conscious or unconscious, the degree to which these experiences are correlated with past behaviors and experiences, and the degree to which polygraph questions may function as a form of conditioned stimulus will remain important but are beyond the scope of work of most field polygraph examiners. For field practitioners, our present knowledge of the psychological basis for observed responses to polygraph stimuli can be assumed to involve multiple psychological processes, including emotion, cognition, attention, motivation, memory and conditioned learning. In a larger sense, it will be wise to continue to expand our polygraph theories as generally within the scope of all available knowledge from psychology, physiology, recording instrumentation, measurement and analytic theories. For the present time, the simplest and most effective approach towards a working theory for practical or applied polygraph testing will be to limit the discussion to information that we can expect to observe in the test data.
If the polygraph is merely a bogus-pipeline tool (Jones & Sigall, 1971) or interrogation prop to be used for obtaining confessions – if the test results themselves are never to be regarded with any value of their own – then the definition of a suitable working theory is neither important nor useful, nor necessary. But if the polygraph is merely an interrogation prop, then it will only be a matter of time before some other technology begins to replace the polygraph test in circumstances for which a scientific test result is desired.

If it is correct that there exist some physiological activities for which there are identifiable differences in their correlation with deception and truth-telling, then it is only a matter of time before scientists and technologists begin to exploit that those physiological activities in a commercialized or productized test format and algorithmic decision model. It will be a mistake for the polygraph profession to attempt to coexist with new scientific credibility assessment tests while relying on a false explanatory hypothesis that centers on un-testable and un-falsifiable subjective emotional experiences that cannot be discriminated by available polygraph recording instrumentation. A polygraph test that premised on false hypotheses, developed at a time when interpretation of polygraph data was limited to subjective expert/clinical judgment that did employ numerical scoring, statistical decision theory or data analytic methods that are possible today, will be vulnerable to becoming an anachronism.

In years past the polygraph test was the only scientific test for credibility assessment and lie detection, and there may have been little motivation for the polygraph profession to advance its foundational explanatory theory. A hypothesis that had superficial appeal was satisfactory even if inconsistent with known phenomena. Today, in the early 21st century, new technologies are emerging and will continue to emerge in the lie detection and credibility assessment space. Those new technologies will not successfully enter the marketplace without a sound working theory, without effective recording technology, and without proven methodologies based on analytic and statistical models.

A scientific theory for polygraph testing must not be inconsistent with reality or other knowledge, even if it means temporarily limiting the range and depth of phenomena for which a theory attempts to make assertions. Attempts to develop a basis of scientific knowledge, or an area of professional practice, on ideas that are inconsistent with reality will result only in ritualism, mysticism, and discon-
nection from other areas of science and technology, and will not result in intellectual, technological and engineering advances that will ultimately contribute toward the achievement of human goals and objectives.

A theory for polygraph testing that is consistent with reality and other scientific knowledge will enable the profession to advance. Professional practices based on false hypothesis will instead remain static, unable to make use of new knowledge and new technologies and new analytic methods. A satisfactory theory for polygraph testing will explain the observable data and evidence, and will be consistent with our knowledge in other areas of science, including measurement theory, test theory, physiology, and psychology.

Because tests are not intended to be a form of perfect deterministic observation, for which neither random variation nor human behavior will change the outcome, nor a form of physical measurement, which requires both a physical phenomena and a physical unit of measurement, all scientific test results are inherently probabilistic and are therefore inherently analytic. In a larger sense, all scientific conclusions, whether from field study, laboratory study, meta-analysis, Monte-Carlo or other, give only statistical approxima-

tion of reality.

If it were possible to achieve a precise measurement of reality, or if it were possible to satisfy our important questions with simple and perfect deterministic observation, then we would not need a test. It is a paradox of reality and the human condition that some of the most interesting and important things that we may want to quantify may turn out to be the most difficult things to quantify. The purpose of a scientific test is to obtain and analyze data that can serve as a statistical proxy to improve our conclusions and decision-making by probabilistically quantifying some amorphous phenomena. Our task is to understand the basis of scientific testing and probabilistic measurement so that we can continue to improve our conclusions and decision-making.

The analytic theory for polygraph testing – that greater changes in physiology are loaded at different types of test stimuli as a function of deception or truth-telling in response to relevant stimuli – describes what we expect to observe when we obtain and analyze polygraph data. Experience with reality will continue to tell us whether this theoretical model, as a description of what we can expect to observe in polygraph data, is satisfactory to assist us with the task quantifying the lev-
el of confidence or margin of uncertainty associated with polygraph test results. Ultimately, the validity of our theoretical and probability reference models will be observed as a function of whether the predicted proportion of correct and incorrect polygraph results corresponds to our calculations and predictions about the correct and incorrect classification of deceptive and truthful polygraph results. A clearly defined analytic theory will help the polygraph profession to advance.

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Scoring Charts within LXSoftware (Paperless)

There are two methods available for manually scoring charts within LXSoftware. The first method is to score each chart as it is completed, one RQ at a time. The second approach involves a “floating” score sheet window, on top of the chart review window, to score all RQs and every chart within the open PF.

The scoring menu items can be accessed by selecting Score from the Series menu, and then choosing open an existing score sheet or create a new score sheet.

The first method makes it easy to quickly score each chart as it is completed.

To Use the Score (Show Scores) Sidebar

1. Go to Series > Score > Show Scores
2. Select the person scoring the exam: Examiner, Reviewer, or 2nd Reviewer.
3. Select the question to score. The question response is then shaded in yellow in the chart review window.
4. Select the incidence of countermeasures for the open PF.
5. Enter comments as needed. It is recommended that a comment be added to any question which includes an artifact.
6. Select the scores for each of the sensors using the drop-downs or by typing the numbers. Click the "Reset all" link if you need to reset the scores.
7. Use the Previous and Next buttons to navigate from one question to another.

To enable the scoring sidebar by default for all charts, go to Tools > Preferences > Hand Score and change the "Show scoring sidebar on startup?" option to Yes.

“Show Scores” will display the scoring sidebar to the left of the chart.

When finished scoring the last chart, click the “Show score sheet” link at the bottom of the “Show Score”
sidebar. The score sheet will appear. The score sheet will have a tab for each scorer listing all scores and totals for each series/exam. The score for each RQ’s Pneumo, EDA, Cardio, and PLE response is shown, along with any other sensors defined in the scoring preferences. The details tab contains relevant information about the chart including the subject name, scoring notes, and any customized information added by the examiner to the score sheet template. When you click the OK button, the score sheet will save to the polygraph file.

![Image of score sheet]

**To Use the Score Sheet (New Score Sheet) Window to Score Charts**

1. Go to **Series > Score > New Score Sheet**. The New Score Sheet dialog shown below is displayed. This dialog displays a list of all charts for the selected Series for the currently open PF. Score sheets can be created as needed by either the original examiner or by first or second reviewers.

   ![Image of New Score Sheet dialog]

2. Select the exam/series to score using the drop-down box.
3. Select the checkbox of the chart(s) you wish to score. To quickly select all charts, click the **Select All** button. To deselect all charts, select the **Clear All** button.
4. Select the score sheet type from the drop-down box.
5. To add charts to the list of charts to score from another exam/series within the open PF, click the link "Add charts from another series..." and select the desired charts to add from the Add Charts window.

6. (Optional) To manually select which relevant questions are added to the score sheet, select the corresponding radio button and then select the OK button. A dialog box showing all relevant questions for the series will be displayed. Choose the questions to be added to the score sheet and OK when finished.

![Image of Select Questions to Score window]

7. When finished, click the OK button. The new score sheet dialog box disappears and the score sheet window appears with the main LXSoftware window in the background. You can toggle between the score sheet and the Chart Review window. To bring the Chart Review window to the front, click on it with the mouse. The score sheet fades, enabling you to see through to the Chart Review window. To bring the score sheet to the front, click on the score sheet.

8. Use the drop-down boxes, or tab between questions, to enter the scores for each question. The score sheet also includes the following time-saving features:
   - The plus sign key (+) adds a score of positive one (1) to the score.
   - The minus sign key (-) adds a score of negative one (-1) to the score.
   - The period key (.) adds an artifact (Ø) to the score.
   - Double-click a sensor to quickly open the corresponding chart with the question's response highlighted.
   - Right-click the score sheet to display the associated chart(s) or to print or save the score sheet to PDF.
   - Use the drop-down boxes to make the final call and spot calls for the exam/series.
   - Click the OK button to save the score sheet to the Polygraph file.
Generate Empirical Score Sheet (ESS) Report

From the Score Sheet, click on the Generate ESS Report link to generate an ESS report. The Generate ESS Report link is only available for Zone, MGQT, TES, DLST, Event Specific, Multi Issue, or DLDT exams. In order to generate the report, there is a required minimum of 3 Charts up to a maximum of 5 Charts selected in the score sheet. Also, the number of Relevant Questions has a required minimum of 2 and a maximum of 4. This applies equally to all exam types.
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