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Polygraph 101 Basic (\$5,750. US/\$6,250. Abroad)

(Academics: 10 weeks, Post-Grad: Two Weeks)

March 7 – May 13

September 26 – December 2

UAE: January 31 – April 14

Guatemala: Contact Us for Dates

Pretoria: Contact Us for Dates

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July 25 – 26

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Pretoria Contact Us for Dates

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May 16- 20; December 5 - 9

Advanced PCSOT (\$450.)

July 27 - 28

Forensic Assessment Interviewing and Integrated Interrogation Techniques (\$600.)

Philly March 14–18; October 3 - 7

Morgan Interview Theme Technique (MITT)

Contact Us for Dates

Academy for Scientific Investigative Training

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Contents

Contributors to this issue

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Raymond Nelson
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Damilola Sholademi

Deadlines

This issue closed on
March 31, 2016.

Deadline for May/June 2016
issue is May 20

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 commercial products, process, or service by trade name, trademark, manufacturer or otherwise, does not necessarily constitute or imply endorsement, recommendation, or favoring by the APA or its leadership.

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POLYGRAPH COURSE TUITION \$4795 !

2016 Schedule

Basic Examiner

- ◆ Feb - May (San Antonio)
- ◆ July - Sept. (Las Vegas)

Validated Interview

- ◆ Check our website
- ◆ Call to host a course

JPCOT/PCSOT

- ◆ May (San Antonio)
- ◆ October (Las Vegas)

TDLR CE Course

- ◆ Contact us for scheduling



- Fully accredited by the American Polygraph Association and approved by the Texas Department of Licensing and Regulation and the American Association of Police Polygraphists. *
- Demonstrated past performance in polygraph training. Our instructors have more than 100 years of combined field experience.
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IN MEMORIAM STEPHEN LEE REESE 1943 - 2016



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Stephen was a member of the APA from May of 1983 until his passing.

Stephen Lee Reese, 65, of Cheyenne, died January 15, 2016 at Davis Hospice Center. He was born September 7, 1950 in Coffeyville, Kansas.

Steve was a Vietnam Veteran who served proudly in the USAF. He had a life long career in law enforcement in Haven and Lawrence, Kansas and Cheyenne, Wyoming. He was self-employed after leaving law enforcement.

He loved sports, especially golf, the Denver Broncos, and KU Jayhawk basketball. Steve was a 24 year volunteer for the CFD Concessions

Committee, a CFD Heel for 12 years and past chairman of the CFD Concessions Committee. He was also a longtime member of the American Polygraph Association.

Survivors include his wife of 39 years, Renee; son, Chris (Carinda), daughter, Tesha; grandsons, Austin and Wyatt and numerous aunts, uncles and cousins. He was preceded in death by his parents, Elmer and Eva Dell Reese. No public service will be held. Cremation has taken place at Cheyenne Memorial Gardens under the direction of Wiederspahn-Radomsky Chapel. Friends may honor his memory with contributions to the CFD Volunteer Assistance Fund or the Cheyenne Animal Shelter.



Polygraph Examiner Training Schedule

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New Jersey Polygraphists Training Seminar

May 23-25, 2016 Atlantic City, NJ

American Association of Police Polygraphists

39th Annual Training Seminar
June 12-17, 2016 Uncasville, CT

American Polygraph Association 51st Annual Seminar/Worshop

August 28- September 2, 2016
Baltimore, MD

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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



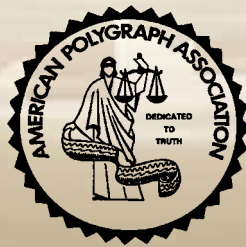
51ST Annual Seminar/ Workshop

American Polygraph Association

FORTIFYING THE EXAMINER

August 28 - September 2, 2016

Hilton Baltimore Hotel



BALTIMORE

—♦—
MARYLAND

MICHAEL GOUGLER
PROGRAM CHAIR 2016

SUNDAY, AUGUST 28, 2016

CLASSROOM A

1:00 - 3:00 PM

3:00 - 5:00 PM

SCHOOL DIRECTOR'S MEETING
1:00 - 3:00 PM
(ROOM TO BE ANNOUNCED)

APA WELCOME RECEPTION
6:30 - 8:30 PM



MONDAY, AUGUST 29, 2016	
CLASSROOM A (disponible en Espanol)	
7:30 - 8:00 AM Break Sponsored by: Baltimore Hilton	
8:00 - 9:30 AM OPENING CEREMONIES	
Call to Order -	Walt Goodson, APA President
Master of Ceremonies -	Michael C. Gougler, Seminar Program Chair
The National Anthem -	
Presentation of Colors -	
Pledge of Allegiance -	Walt Goodson, APA President
Taps -	Richard Pascuito, APA Member
Welcome to Baltimore -	Joe Bradley, Chief, FBI Polygraph Program
Invocation -	Barry Cushman, APA Director
9:30 - 9:45 AM Break Sponsored by: Baltimore Hilton	
9:45 - 12:00 NOON	
APA Standards of Practice	
Walt Goodson, APA President	
Patrick O'Burke, APA President-Elect	
12:00 NOON - 1:00 PM Lunch on your own	
1:00 - 5:00 PM	
SHIELD: Strength and Honor in Everyday Lawful Decisions	
Melvin Allick, Texas DPS	
Lacy Wolff, Texas DPS	
2:45 - 3:00 PM Break Sponsored by:	
(CONT'D)	
SHIELD: Strength and Honor in Everyday Lawful Decisions	
Sgt. Melvin Allick Texas DPS	
Lacy Wolff, Texas DPS	
BLUE JAYS vs. ORIOLES 7:05 PM	
Stadium just across the street	



TUESDAY, AUGUST 30, 2016

7:30 - 8:00 AM Break Sponsored By:

CLASSROOM A (disponible en Espanol)	CLASSROOM B	CLASSROOM C
8:00 - 9:45 AM Discussion of Valid Polygraph Principles James B. McCloughan APA Director	8:00 - 9:45 AM PCSOT Model Policy Guillermo "Gil" Witte San Diego Police Department PCSOT hours	8:00 - 9:45 AM Building your SHIELD: Practical Application of Resilience Strategies Lacy Wolff, Texas DPS

9:45 - 10:00 AM Break Sponsored By:

APA ANNUAL BUSINESS MEETING
10:00 AM - 12:00 NOON
CLASSROOM A

12:00 Noon - 1:00 PM Lunch On Your Own

1:00 - 2:30 PM PLE Principles Mark Handler, APA Editor Pam Shaw, APA Past President	1:00 - 2:30 PM Current Issues in PCSOT Testing Benjamin Blalock Director, Academy of Polygraph Science PCSOT hours	1:00 - 2:30 PM APA Applicant Screening Model Policy Barry Cushman, APA Director
--	---	--

POLYGRAPH INSTRUMENTS WORKSHOP
2:30 - 4:00 PM

CLASSROOM A
LAFAYETTE
INSTRUMENT

CLASSROOM B
LIMESTONE
TECHNOLOGIES

CLASSROOM C
ACXITON

CLASSROOM D
STOELTING
COMPANY

7:00 - 11:00 PM THE NATIONAL AQUARIUM

Tour the Aquarium, Hors D'oeuvres, Dinner, Dessert and Cash Bar
Less than a mile from the hotel, transportation on your own



WEDNESDAY, AUGUST 31, 2016		
7:30 - 8:00 AM Break Sponsored By:		
CLASSROOM A (disponible en Espanol)	CLASSROOM B	CLASSROOM C
8:00 - 12:00 NOON Current Issues: A Panel Discussion Moderator, Gordon Vaughan Walt Goodson Mark Handler Barry Cushman Jack Trimarco Joe Bradley	8:00 - 12:00 NOON TBA National Center for Credibility Assessment Faculty	8:00 - 12:00 NOON Reducing Inconclusive Exams Benjamin Blalock, Director Academy of Polygraph Science
9:45 - 10:00 AM Break Sponsored By:		
(CONT'D) Current Issues: A Panel Discussion Moderator, Gordon Vaughan Walt Goodson Mark Handler Barry Cushman Jack Trimarco Joe Bradley	(CONT'D) TBA National Center for Credibility Assessment Faculty	(CONT'D) Reducing Inconclusive Exams Benjamin Blalock, Director Academy of Polygraph Science
12:00 Noon - 1:00 PM Lunch On Your Own		
1:00 - 5:00 PM TBA National Center for Credibility Assessment Faculty	1:00 - 3:00 PM Interview & Interrogation: The Peace Model Andy Griffiths England, United Kingdom	1:00 - 5:00 PM PCSOT Question Construction & Target Selection Guillermo "Gil" Witte San Diego Police Department PCSOT hours
2:45 - 3:00 PM Break Sponsored By: TEXAS ASSOCIATION OF POLYGRAPH EXAMINERS		
(CONT'D) TBA National Center for Credibility Assessment Faculty	3:00 - 5:00 PM Law Enforcement, Federal, and Government Examiners: Starting a Private Practice and Keeping it Going George Baranowski APA Director	(CONT'D) PCSOT Question Construction & Target Selection Guillermo "Gil" Witte San Diego Police Department PCSOT hours



THURSDAY, SEPTEMBER 1, 2016

7:30 - 8:00 AM Break Sponsored By:

CLASSROOM A (disponible en Espanol)	CLASSROOM B	CLASSROOM C
8:00 - 3:00 PM Quality Assurance Lt. Matt Mull, Texas DPS Lt. Dennis Westerman, Texas DPS Lt. Matt Hicks, Texas DPS TDLR credit	8:00 - 10:00 AM TBA Andy Griffiths England, United Kingdom <hr/> 10:00 - 12:00 NOON TBA - PCSOT Patrick O'Burke APA President-Elect PCSOT credit	8:00 - 12:00 NOON Domestic Violence Testing & Model Policy Rob Lundell PCSOT credit

9:45 - 10:00 AM Break Sponsored By:

12:00 Noon - 1:00 PM Lunch On Your Own

(CONT'D) Quality Assurance Lt. Matt Mull, Texas DPS Lt. Dennis Westerman, Texas DPS Lt. Matt Hicks, Texas DPS TDLR credit	1:00 - 5:00 PM Discovering Countermeasures Mark Hander, APA Editor Pam Shaw, APA Past President	1:00 - 2:45 PM Recent Cases: Interrogations & Confessions Gordon Vaughan APA General Counsel
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2:45 - 3:00 PM Break Sponsored By:

3:00 - 5:00 PM Psychological Issues that Affect Polygraph Exams Tiffany Collier University of Texas, Permian Basin	(CONT'D) Discovering Countermeasures Mark Hander, APA Editor Pam Shaw, APA Past President	3:00 - 5:00 PM APA Examinee Suitability Model Policy Raymond I. Nelson APA Chairman of the Board
--	--	--

SCHOOL INSPECTOR TRAINING 3:00 - 5:00 PM
(ROOM TO BE ANNOUNCED)

APA ANNUAL BANQUET AND AWARDS
 KEYNOTE SPEAKER - RICK DEMPSEY - FORMER BALTIMORE ORIOLES CATCHER
 6:30 - 7:00 PM COCKTAILS
 7:00 PM DINNER



FRIDAY, SEPTEMBER 2, 2016

7:30 - 8:00 AM Break Sponsored By:

CLASSROOM A (disponible en Espanol)	CLASSROOM B	CLASSROOM C
8:00 - 12:00 NOON Interviewing and Eliciting Information from Resistant Subjects Lori L. Hauser, PhD, ABPP	8:00 - 10:00 AM Contemporary Polygraph Theory: Evidence Based Answers to Common Questions Raymond I. Nelson APA Chairman of the Board	8:00 - 12:00 NOON Examiner Well Being: Dealing with Stress Tiffany Collier University of Texas, Permian Basin PCSOT credit

9:45 - 10:00 AM Break Sponsored By:

(CONT'D) Interviewing and Eliciting Information from Resistant Subjects Lori L. Hauser, PhD, ABPP	10:00 - 12:00 NOON Algorithm Development - Artifact Detection via Machine Learning and Statistical Learning Theory Raymond I. Nelson APA Chairman of the Board	(CONT'D) Examiner Well Being: Dealing with Stress Tiffany Collier University of Texas, Permian PCSOT credit
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12:00 Noon - 1:00 PM Lunch On Your Own

1:00 - 3:00 PM TBA	1:00 - 3:00 PM TBA	1:00 - 3:00 PM Testing the Juvenile Sex Offender Sabino Martinez, Co-Director Veridicus International Polygraph Academy PCSOT credit
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3:00 PM
CLOSING REMARKS
J. Patrick O'Burke
APA PRESIDENT





51ST ANNUAL APA SEMINAR

AUGUST 28 - SEPTEMBER 2, 2016

HILTON BALTIMORE

401 WEST PRATT STREET

BALTIMORE, MARYLAND 21201

ADVANCED REGISTRATION IS REQUIRED



(All room reservations must be made individually through the hotel's reservation department, or using the On-Line Group Page)

1-800-444-8667 - In house 443-573-8700

(insert On Line Group Page link)

APA FED ID #52-1035722

ROOM RATE: \$132.00, Single/Double occupancy, plus taxes (currently 15.5%), all reservations must be guaranteed by a major credit card or advance deposit in the amount of one night's lodging. Reservations not guaranteed will be automatically cancelled at the cut-off date.

CUT-OFF DATE for hotel reservation is 7/15/16 or until APA's room allotment is fulfilled. Number of rooms is limited. Individual departure dates will be reconfirmed upon check-in. (72 HOUR CANCELLATION NOTICE)

REGISTRATION HOURS: Sunday, 8/28/16 10:00am - 5:00pm
Monday, 8/29/16 7:00am

Seminar Sessions: Sunday-Friday, 8/28/16 - 9/2/16
APA Cancellations and Refund Policy: Cancellations received in writing prior to 7/15/16 will receive a full refund.

Registration fee includes professional instruction, seminar materials, refreshment breaks, Sunday Reception and Thursday banquet)

MONDAY NIGHT 7:05 PM
BLUE JAYS vs. ORIOLES
Tickets \$___ each
#___=\$___

TUESDAY NIGHT EVENT
TBA

THURSDAY NIGHT BANQUET
___ #attending
___ will not attend
___ vegetarian meal(s)

NAME: _____ PHONE: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

EMAIL: _____

NAME ON BADGE: _____ GUEST NAME ON BADGE: _____

ADDITIONAL \$50 FOR THOSE WHO PAY AT THE SEMINAR

PAYMENT RECEIVED BY JULY 15, 2016

___ \$400 - MEMBER/APPLICANT

___ \$550 - NON-MEMBER

___ \$175 - PER GUEST (Cannot Attend classroom presentations)

(Guest fee includes: Sunday Reception, Guest Brunch Monday and Banquet Thursday)

PAYMENT RECEIVED AFTER JULY 15, 2016

___ \$450 - MEMBER/APPLICANT

___ \$600 - NON-MEMBER

___ \$225 PER GUEST (Cannot Attend classroom presentations)

(Guest fee includes: Sunday Reception, Guest Brunch Monday and Banquet Thursday)

Your nametag is your admission to all events and activities. Please wear it at all times during the conference.

___ \$100 - Translation Equipment Fee (must be paid to use the translation equipment)

PLEASE MAKE CHECKS PAYABLE TO: APA

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Signature: _____

By signing here, I give my permission for my name and email address to be listed on the APA Mobile App

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LISA JACOBS, MANAGER

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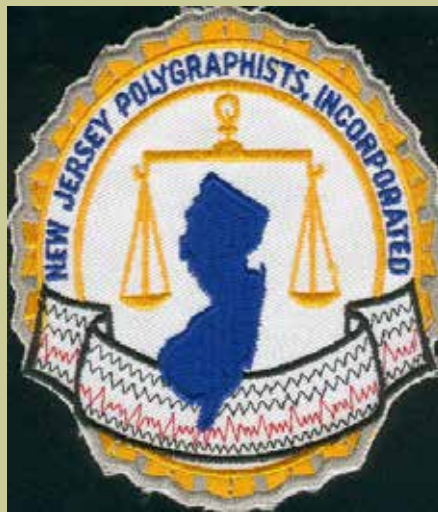
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New Jersey Polygraphists

2016 TRAINING SEMINAR

“Evidence-Based Interviewing
Techniques”



*May 23-25, 2016
Tropicana Hotel and
Casino
1-800-THE-TROP
www.Tropicana.net*

New Jersey Polygraphists, Inc. is the only statewide organization of certified polygraph examiners in New Jersey. We are comprised of polygraph examiners in private practice, police agencies, and various government entities. All of our members use only validated test formats and follow APA published best practices.

New Jersey Polygraphists is a national leader in providing premier polygraph training at our annual seminars, which are offered at minimal cost to all examiners. Past speakers have included the leading names in polygraph research in the world including Dr. John Kircher, Dr. David Raskin, Don Krapohl, Dr. Charles Honts and Raymond Nelson.

New Jersey Polygraphists embraces and supports scientific research to improve and advance polygraph testing.

NEW JERSEY POLYGRAPHISTS:

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Jim Shilling, Secretary

Mark Smith, Treasurer

Jerry Lewis, Board Chair

Evidence-Based Questioning Techniques

The methods most investigators use to obtain confessions have increasingly come under fire for being coercive, unethical and often unconstitutional. The results: Statements barred from criminal trials and civil jury awards in the millions of dollars. Fortunately, the science of eliciting information has greatly advanced in the past 20 years.

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This training will improve your skills by making you a **better, more effective, ethical and professional interviewer** while avoiding coercive tactics that lead to lost evidence and lost reputation in court.

HHH, LLC consists of Dr. Charles Honts, Professor of Psychology at Boise State University, Dr. Maria Hartwig, Professor of Psychology at John Jay College of Criminal Justice and Mark Handler, polygraph examiner, researcher, educator, and former police officer.

Registration Form

Cut and mail this section or send this information to the address below:

Name:

Email:

Phone:

Agency/Company:

Make checks payable to:

New Jersey Polygraphists

Mail check and registration info to:

NJP

P.O. Box 50
Pompton Plains, NJ 07444-0050

Registration Information

Dates:

Monday May 23, 2016
8:00 a.m. to 5:00 p.m.

Tuesday May 24, 2016
8:00 a.m. to 5:00 p.m.

Wednesday May 25, 2016
8:00 a.m. to 12:00 p.m.

Registration Fee:

Non-members: \$350
NJP members: \$250

Registration includes:

- 20 hours of APA approved training.
- Lunch Monday and Tuesday
- All training materials
- Certificate of training upon successful completion
- Continental breakfast all 3 days
- Morning and afternoon snacks

NJP has secured a discounted room rate of \$69 per night. Room is not included in your registration and you must make reservations directly with The Tropicana Hotel. Mention NJP to receive the room discount.

This is a rare opportunity to get the highest quality training at an extremely affordable price.

Questions?

Mark Smith: 973-931-2028
Callmps@aol.com



“Price is what you pay.
Value is what you get.”

- WARREN BUFFET



President's Message

Walt Goodson

I appreciate all of you who took the time to read my previous message and I'm especially thankful for several of our members who communicated their insightful feedback to me regarding the issues I raised in that article. In that Jan/Feb 2016 Magazine message, I asked whether it was time to reconsider our electronic election process. A few of our members asked this question, and I felt it was worth seeking a larger perspective. I'll share the consensus of the members with whom I spoke, as well as the viewpoint of the APA Board of Directors on our election process later in the message. However, I want first to brief you on the recent Board actions and considerations, including our Winter Board of Directors Meeting we held this past March. The JW Marriott Las Vegas Resort hosted our Winter Board Meeting, and it will also serve as the host site for our 52nd annual seminar in 2017. This resort will once again raise our expectations of a conference venue. I've been fortunate to visit most of the major hotels in the Las Vegas area, and the JW Marriott Resort is as good as they get.

In my opinion, one of the highlights of the Winter Board Meeting was the approval of the Model Policy for Post-conviction Domestic Violence Testing. A primary goal of my presidency is to enhance public safety through the expanded use of the polygraph and to increase the demand for these type of exams. I'll try not to get on my soapbox for too long, but it is evident to me that protecting others is the key to our future. Additionally, there's not a more rewarding part of this job than being involved in this endeavor. OK, I'm off the box now. Unfortunately, I didn't know how to go about this by myself. Fortunately, the APA has the luxury of proactive, experienced and talented members like Rob Lundell, who offered to help me. Mr. Lundell and our Editor, Mark Handler, who was Chairman of the Ad Hoc Committee, along with the assistance of Jeff Jenks, wrote an effective model policy in very short order. The Board approved this model policy, and I hope it will provide insight of how to administer effective tests that will help expand the use of the polygraph to protect the victims of these tragic situations. This accomplishment meets one of the goals of the 2016-2020 APA Strategic





Plan published in Jan/Feb 2016 Magazine. In carrying out the objectives of this plan, I hope to create additional similar model policies such as a policy that could employ the polygraph to reduce drug court dockets.

A second item the Board of Directors viewed favorably was a proposal to make adjustments to our membership structure within our Article III of the APA Bylaws. The suggested modification would change APA “Associate Members” to “Associates” and APA “Full Members” to “Members.” Additionally, the proposal offers applicants who can demonstrate at least 750 hours of law enforcement continuing education, five years investigative experience, and a college Associate’s Degree to serve as an additional pathway to Member status. This new avenue to Member status seems reasonable since the greatest source polygraph examiners typically come from law enforcement careers that do not always require college degrees. Anecdotally, the 1000s of hours of law enforcement training, regular courtroom testimony and the daily investigative work of my police career better equipped me with the critical thinking skills necessary to be a competent polygraph examiner than I ever gained from my undergraduate degree. Taking this step will hopefully encourage more professional polygraph examiners to seek APA membership and follow our high standards. I have heard the counter-argument US Marine Corps slogan, “The few; the proud” expressed as it relates to our membership. I appreciate that sentiment; unfortunately, APA Members are represented by every good, bad and ugly



polygraph exams which have the potential to be presented in a courtroom, regardless of whether one of our members administers it. As a result, it seems that the more examiners following APA standards of practice give us the greatest chance of future success. Thus, we need to be more attractive to our largest demographic. The Board has only considered this issue for now, but I hope to present a motion to adopt these changes very soon.

This amendment to our membership titles and prerequisites is the first part of a larger plan designed to encourage education and participation which advance the profession. I intend to introduce the second part of this idea in Baltimore. Essentially, it's a series of certificates that distinguish our most active and dedicated members. Such certificates would recognize various achievements, such as advanced academic degrees, extensive practical experience and acceptance of quality assurance reviews. The certificates would also recognize service to the profession such as participation on polygraph boards and committees, seminar and school instruction, and authoring credibility assessment related publications.

As I mentioned previously, having a large and experienced membership is healthy for the profession. Unfortunately, many of our tenured and pioneering members are not recognized for their considerable contributions to the APA and the profession. I think we need to do more to recognize our tenured members. As a result, during the Winter Board Meeting, the Board approved providing distinctive seminar badges and pins for our members who achieve 10, 20, and 25 years of continuous membership. Thus, beginning in Baltimore, members who have reached these milestones will receive these special and deserving recognitions. For our 25-year members, the Board approved gold pins with diamond inserts. These pins are similar to the APA President's Pin and will be presented at the annual business meeting.

Finally, the Board discussed strategies to maximize social media to connect with our members and provide real-time information related to the association and the profession. Director Darryl Starks is currently exploring the world of Facebook, Twitter, Instagram and others to provide our members with additional options to connect to the APA.

As for board actions, in February, Director Barry Cushman, General Counsel Gordon Vaughan and I attended the American Academy of Forensic Sciences (AAFS) Annual Meeting. The goal of our attendance was to develop an understanding of how polygraph



and credibility assessment fit into the AAFS as well as how to elevate our stature as forensic science. From my observations and discussions with AAFS members, polygraph seems to be absent from the AAFS domain, and our path to inclusion is going to be lengthy. As you are keenly aware, members of the AAFS typically begin their careers in academia while polygraph examiners usually start theirs on the streets, conducting investigations. As a result, each of the forensic sciences has a significant body of researchers in universities and scientific laboratories throughout the world who are pursuing and publishing research. Bridging this gap could be arduous since the majority of us don't work in scientific labs, and there are no degree plans in credibility assessment.

How do we remedy this? I don't have these answers; however, my suggestion is that recognition usually begins with a face. In other words, our profession and more specifically our association needs consistent executive leadership who can persistently approach the AAFS and vice-versa. During my five years on the Board, the single greatest weakness I have observed is a lack of continuity in pursuing and completing tasks to move the profession forward. This instability is not the fault of the Board. Despite a cohesive good-intentioned group of leaders, it has repeatedly proven difficult to gain momentum in accomplishing tasks with one-year presidential terms and high turnover on the Board. This fragility is one of the reasons suggested for changing one-year vice-president positions to two-year directors.

Our current organization structure makes it difficult for a single board member to become recognized as a leader in the profession because of the part-time and finite nature of our elected positions. Instead, it may be the time for the APA to explore the advantages of adding an Executive Director (ED) or CEO to the organization. A distinct advantage to an ED is having a person with the time to develop alliances with leaders in the forensic science community. An effective ED could help demonstrate what we already know; that polygraph positively impacts public safety as much or more than a majority of the other sciences. Additionally, an ED could affect the additional validation of the polygraph as a scientific tool.

There are countless other ways an ED could benefit the APA. Besides an authority who could represent our interests throughout the world and a leader who could consistently pursue our goals, an ED could enhance the effectiveness of the APA and Board of Directors in many ways. For example, an ED could streamline polygraph school accreditation



practices that could result in savings to polygraph schools. An ED could increase revenue by improving membership renewal practices that currently result in over 700 non-renewals each year. An ED could also manage our annual and sponsored seminars, just to name a few. Hiring an ED is a decision the APA should explore carefully; thus, the first step is to publish a more comprehensive list of the pros and cons of such a position and ultimately allow the membership to decide the merit of an ED. If the association sees this as a worthy endeavor to pursue, the next step will be to outline the desired qualifications for such a position and create a policy that defines the scope of ED authority as well as their duties and responsibilities. I look forward to hearing your feedback on this issue. I intend to discuss this matter and many others during an opening session presentation with incoming President Patrick O'Burke. During this talk, the APA mobile device application (QuickMobile) will enable your smartphone or another mobile device to serve as a polling tool. This polling feature will allow attendees to share their opinions on the ED and other various issues by anonymously answering questions that display on their device. The application will show the comprehensive responses from the audience on the large screen. My hopes are that your input at this meeting will provide future APA leadership with an understanding of the will of the membership.

As I mentioned in my last message, the current election process has been called into question by a few of our members due to its limited capacity to offer candidates an opportunity to share their platforms beyond a 500-word candidate statement and a photo. Unless you know the candidate, there is little chance for interaction or feedback to clarify a candidate's position on the issues. After the publication of that message, I received considerable support for the current electronic election process. Moreover, informal discussions with APA board members during the Winter Board Meeting revealed unanimous backing for the current process. It is very clear to me that access to the polls is most important to us. Although almost everyone seemed open to ideas that provide universal access to the polls, while also providing candidates with expanded opportunities to present their platforms and interact with the membership. The Board and I especially feel this is necessary for our highest position of president-elect. One possible solution may be to provide our president-elect candidates with an opportunity to announce their candidacy and deliver a five-minute presentation at the annual business meeting.

This method, of course, was the way candidates shared their vision when we held elections at our annual seminars. Such an approach could offer the voters with an opportunity to



question our presidential candidates on their platform and vision for the APA. Such a solution may also increase the business meeting attendance which is also healthy for our organization. Improving the election process will be another issue incoming President O’Burke, and I will discuss and poll during our presentation in Baltimore.

In the coming months, I hope to provide you with more details on some of the items above in which your board is hard at work. As a couple of reminders, please don’t forget to register and secure your lodging for our 51st annual seminar scheduled to take place in Baltimore, MD August 28th to September 2nd. The interest so far has led us to believe this will be the largest attendance in our history. Secondly, if you are a member of another professional polygraph association, please consider applying for Divisional Affiliate status. On 9/1/2015, the membership voted to adopt a revised bylaws. This adoption eliminated “Divisional Membership” and added a category of membership for “Divisional Affiliate.” Existing Divisional Members did not automatically transfer over as Divisional Affiliates. All polygraph associations that meet the approved criteria and want to seek Divisional Affiliate Membership are urged to contact the APA National Office to initiate the processing of an application. Opting for this status encourages more professionals to adhere to APA Standards of Practice. As I mentioned earlier, there is strength in numbers and the more polygraph members and affiliates we have benefits us all.

Thank you for what you do to make our world a better place. Enjoy the remainder of Spring!



Board of Directors' Reports

Patrick O'Burke
President Elect

Spring has sprung and the APA Board has recently finished our mid-year meeting in Las Vegas. We were able to visit the beautiful J. W. Marriott property in Las Vegas during our Board meeting. This Marriott resort property will be the site for our 2017 annual conference. This is a truly gorgeous location with an excellent golf course and view of Las Vegas. There will be a lot to regret if you miss our 2017 conference, so please plan on being there.

The Board is concerned with several issues that directly affect you as a member. We are striving to understand how to increase member participation in our voting process for Board officers. This has been an issue for a number of years and we are looking at all of our options, past, present and off the shelf. There are always a lot of thoughts on this, however, it seems that we may continue the online voting as our best option. Perhaps what we need is to way to actually invigorate the election process by encouraging candidates who have not previously given to the profession. I am absolutely positive that if you are reading this article then you should be considering serving on a

committee, or running for a Board position. Please think about who better to be on the Board than someone like you who is taking the time to be interested in what happens. I hope you will give consideration to serving in some capacity.

The Board wants to simplify membership levels and provide incentives for individual member growth. This approach is designed around new examiners having an associate status during initial development. After that, all members will simply become "Members". Levels for proficiency and achievement will be awarded where education, training and Member participation in compliance and organizational support are achieved. President Goodson and I are actively engaged in this as a long term project for increasing member retention and increased professionalism. If you have some ideas on member status or retention, then please contact myself or President Goodson.

The Board also voted to approve several Divisional Affiliates memberships at the meeting. Congratulations to those polygraph associations who have shown a professional dedication to supporting the APA Standards of Practice and Model Policies. Please look for these ne Divi-



sional Affiliates to have their association logos posted on the APA website. This is our partnership with all professional association for standardizing and supporting professional growth.

The Standards of practice has a healthy challenge in trying to develop a Standard of practice that encourages and supports polygraph examiners in participating in quality control review of polygraph examinations they conduct. For many, in large agencies with multiple examiners this is not even a concern. However, there are a significant number of examiners from small agencies or businesses where there is only one examiner. I often wonder and do not understand how they do not have internal policies about compliance with quality assurance. Reviews. As such we will be working on a Model Policy for quality assurance reviews for all examiners. This is a complex issue and we would like to hear from examiners who can give their own perspectives on this challenge.

I would also like to hear from examiners who do not use computer scoring algorithms for their examinations as part of a quality assurance check of their own work. We will probably have some training on this at the annual conference.

One more thing, the end of March is the

end of the APA fiscal year. If you have not renewed your APA membership by March 31, then your place in the finest professional polygraph association in the world is now expired. If we do not have your email address, then we do not even have a way to get in touch with you to discuss it. Please support your profession by renewing that APA membership today. I really do want you in the APA as our member and would like to know how we keep you in our association. If you have decided not to renew, please contact me to let me know why and how I could get you back. Thanks and I will see you in Baltimore.

Gary F. Davis
VP Private

Spring is upon us and soon the 2016 Seminar and Business Meeting will begin and new Officers will be installed. Last year, less than 500 members voted in our election. I know we are all busy and tend to overlook things we don't believe will affect us. I have been a member of the APA since 1982. In the "old days" elections were held at the Business Meeting and only those that were present were allowed to vote. I believe the change to Electronic Voting is a good thing, every member now has the opportunity to make his or her voice heard.



Our profession is changing. The move to Evidence-based Testing and automated scoring is critical to our survival. We need to pick leaders who understand the needs of our profession and our members. I urge you to review the position statements of all candidates, look at postings on social media to see what position a candidate takes on issues that impact all of us. If you disagree with a candidate or don't know what position they have on issues important to you, call or email them. Knowing a candidate's position on the issues will make this Association strong.

Every year it seems we have a number of uncontested seats on the Board of Directors. This lack of interest in leading our profession can do nothing but weaken our standing in the Scientific and Forensic Communities. If you can't serve in an elected position, at least make your voice heard by those serving you on the Board.

Last year I was elected Vice President-Private as an unopposed candidate. I hope I have faithfully served your interests and those of our profession. I have filed for election to the Board of Directors hoping to serve you for another year. There are a number of positions up for election, if you have the time and desire to serve I urge you to file. The process is easy and can be done on line.

I am looking forward to seeing as many members as possible in Baltimore. I know training can be very expensive and there are less expensive alternatives. But remember the APA is the leader in distributing current research on techniques, scoring, etc. The Standards of Practice and Model Policies provide a solid foundation for your practice and inspire confidence with your clients. So lets all go out and make an informed decision on who will represent us on the APA Board of Directors. I urge you to vote for the Candidate of your choice.

George H. Baranowski
Director

Well we're finally getting closer to spring and then summer. It's about time. There was a most productive Board meeting that was held this last March at the 2017 conference location in Summerlin, NV near Las Vegas. Regarding this facility, I was completely overwhelmed by this place. Now I've been at Hotels and conference location for a number of years now, but this J.W. Marriott is like nothing I've ever witnessed before. First, IT'S NOT ON THE STRIP. You don't deal with any of those crowds, traffic and all that other aggravating issues, its in the suburbs. Second, it's huge, has two towers, restaurants of course, shopping, gam-



bling of course, pools, a golf course (there maybe two I don't know, or just one big one.) The landscape that surrounds the facility is fantastic, waterfalls and rock gardens all over the place. I can't begin to describe the meeting rooms that we were shown. In a sense, I was deeply impressed by the whole works. It's going to be something.

Ok, now let me turn to our upcoming conference August 28 to September 2, 2016, at the fabulous Baltimore Hilton Hotel. I talked about this location in our last issue and its promising to be out-of-sight. In addition to some of the most outstanding speakers, our Conference Chairman Michael Gougler has put together some great extras and attractions. For example, attending the Blue Jay's vs Orioles Monday night baseball game in the stadium that's just across the street from the hotel. A great get-together on Tuesday night at the famous National Aquarium, which will include a tour, Hors D'oeuvres, Dinner, Dessert and a Cash Bar. And then of course the Traditional APA Annual Banquet and Awards, with a surprise Keynote Speaker.

I have the honor of being one of the speakers at the conference, speaking on: "Law Enforcement, Federal and Government Examiner: Starting a Private Practice and Keeping it Going." You know, like it or not, sooner or later, government

and law enforcement examiners will become retired and consider going into private practice. I decided to give this talk because our fellow examiners have contacted me on numerous occasions over the years for advice or encouragement. Studies have shown that such examiners who have been forced to retire due to injuries and decide to become a private examiner wash out within 18 months. The reason for this is kind of simple when you think about it. Government and Law Enforcement Examiners know about polygraph testing, know about interview expertise, know how to chase and catch bad guys, but they seldom just don't know how to start, manage and keep a private practice going.

Their agency provided them the building, the office space, polygraph equipment, materials, perhaps a vehicle insurance, vacations, compensation time, holidays, days off, perhaps even a clothing allowance and often up-to-date training. It just simply wasn't your job to do all that work. I think you get the message where this presentation is going to go. I have been in private practice over 30-years and I am looking forward to sharing information.

Take care, and keep safe



Steven Duncan
Director

Fellow APA Members, I trust everyone is having a good start on Spring, even those of you in Denver who got a Blizzard. Oh, well. Spring in the Rockies.

We, on the Board along with support Members, have been busy with Committee duties and participating in the Board of Director's Meeting. Progress is being made on several fronts along with new and exciting ideas to pursue.

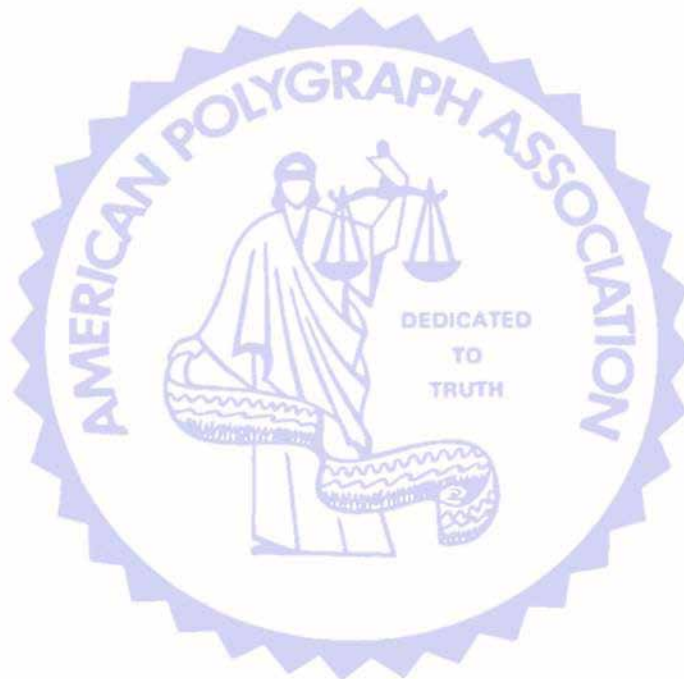
Your Ethics and Grievance Committee is still busy at work with six Case Investigations completed and four Cases ac-

tive and still under Investigation. Work is also continuing on the new Policy for the Committee.

I have continued to assist several Members with concerns and questions through emails and phone calls.

I want every Member to know, I am still, as I always have been, available to assist in any way I can. If you have new ideas, questions or complaints, I will be glad to listen and discuss them with you. I am here to represent you.

If I can assist any Member, feel free to call or email me.



Secretary's Report Of Board Actions

Submitted by Lisa Jacocks

This report covers the time period of February – March 2016

March 11, 2016 – Board Meeting

- Approved the minutes of the BOD meeting August 29-29, 2015
- Approved the minutes of the New BOD meeting September 5, 2015
- Approved the minutes of the BOD teleconference January 14, 2016
- Approved requiring those wanting to conduct basic PCSOT training to use the EAC pre-program and end-grogram forms
- Approved moving the section in the APA Standards of Practice on PCSOT testing currently in Scoring 1.8.6 to Testing 1.7.10
- Approved nominating Pat M. Stoltzfus for Retired Member status
- Approved nominating Perry V. Taylor for Retired Member status
- Approved the membership of Barend J. Lombaard
- Approved the membership of Thomas W. K. Mote
- Approved January 1, 2016 as the date when all previous divisional membership ceased to exist as per the change in APA bylaws
- Approved the Divisional Affiliate membership of the South African Professional Polygraph Association
- Approved the Divisional Affiliate membership of the Southern African Polygraph Federation
- Adopted the Model Policy for Post-Conviction Domestic Violence testing
- Approved allowing Polygraph School Directors to use their own approved PCSOT written examination for their PCSOT course

March 12, 2016

- Approved the accreditation of the International Academy of Polygraph
- Approved the accreditation of the American International Institute of Polygraph
- Approved Maryland Polygraph Association members attending the APA seminar in Baltimore at the APA member rate
- Approved the contract with QuickMobile for the seminar mobile app
- Approved the Divisional Affiliate membership fee at \$50 annually
- Approved paying the expenses for 2 volunteer interpreters for the APA seminar in Baltimore



Research Standards for APA Publications

Approved by the Board of Directors of the American Polygraph Association on
March 11, 2011

Whereas all tests are scientific tests, and whereas the instrumental detection of deception and related test methods depend on the integrity of the underlying scientific constructs and normative data, and whereas the effectiveness of individual examinations and individual polygraph programs depends on an evidence-based scientific approach to credibility assessment and the instrumental detection of deception, and whereas the advancement the science of credibility assessment, the instrumental detection of deception, the polygraph profession, and the APA, requires the ability to carefully evaluate the integrity and accuracy of research and scientific knowledge, and whereas the effectiveness of the polygraph profession and the APA affect the safety and well being of our communities, agencies and countries, and whereas the endorsement or acceptance of inaccurate or falsified scientific evidence may cause lasting damage to the effectiveness of the polygraph profession and the APA, and could cause harm to our communities, agencies, and nation, the following Research Standards for APA publications are enacted:

1. All researchers shall honor the human dignity and rights of study participants and shall document their methods for obtaining informed consent and protection from harm to study participants that may occur as a result of participation in research activities,
2. Researchers shall obtain informed consent from all subjects and participants,
3. Researchers shall refrain from using experimental testing methods with human subjects in evidentiary, investigation and field screening programs unless the examinee provides documentation of informed consent to the use of an experimental method. Experimental methods shall be all methods without published evidence of validity that meets the APA requirements for criterion accuracy,
4. Researchers shall refrain from plagiarism, and shall accurately cite material that are attributed to previous authors and other publications,
5. Publications shall accurately identify all contributors and the nature of their contribution. Researchers shall refrain including non-contributing authors on publication by-lines. Researchers shall refrain from publishing scientific information from un-named contributors, except where personal or national security interest may prevent the identification of an author, in which case an author may be identified anonymously,



6. Principle investigators shall refrain from contributing data as a study participant,
7. Researchers and principle investigators shall accurately identify all proprietary and financial interests, funding sources, and potential conflicts of interest that might compromise the objectivity of the study results,
8. Researchers and principle investigators shall accurately identify all hypothetical formulations and thought experiments that are not evidence-based conclusions,
9. Principle investigators shall accurately identify the type and method of study design, whether survey, program evaluation experimental, quasi-experimental, case studies, meta-analysis, literature surveys, etc.,
10. Principle investigators shall provide sufficient statistical information in publication to permit a competent analysis of the study, including: sample size, demographic information, statistical errors of measure for survey data, calculations of statistical significance that describe the probability of a type 1 error for experimental and quasi-experimental results, along with statistical power analysis or statistical confidence intervals that permit evaluation of the likelihood or probability of a type-2 error,
11. Researchers shall make data available for addition review and extended analysis,
12. Descriptions of criterion accuracy levels shall minimally include calculations of test sensitivity, test specificity, and inclusive rates for all criterion categories, along with calculations and statistical errors of measure for Fleiss' Kappa statistics regarding interrater reliability,
13. Researchers and principle investigators shall identify study limitations, including sampling limitations, confounds, and threats to both internal and external validity for all study results,
14. Researchers and principle investigators shall identify needs for further research pertaining to all study results,
15. Researchers and principle investigators shall clearly indicate scientific evidence or conclusions that are published without peer-review, and
16. Researchers and principle investigators shall refrain from any falsification of study results or alteration of data to achieve a study result.



APA Standards of Practice

(Effective September 1, 2015)

- 1 Statement of Purpose: To promote the highest degree of decision accuracy in credibility assessment, the APA establishes for its membership the following Standards of Practice. All examinations are required to be conducted in compliance with governing local, state, and federal regulations and laws.
 - 1.1 Definitions
 - 1.1.1 Polygraph examination: a psychophysiological test of deception or recognition sometimes referred to as lie-detection as a term of convenience. The polygraph examination is a standardized, evidence-based test of the margin of uncertainty or level of confidence surrounding a categorical conclusion of deception or the possession of knowledge or information regarding a test target issue. Test data are a combination of physiological proxies that have been shown to vary significantly with different types of test stimuli as a function of deception or truth-telling in response to the relevant investigation target stimuli as a function of deception or truth-telling in response to the relevant investigation target stimuli. The psychological basis of responses to polygraph stimuli is thought to involve attention, cognition, emotion, and behavioral conditions. The examination consists of an interview phase, to clarify the issue under investigation and related test stimuli, a data acquisition phase, during which physiological responses to test stimuli are permanently recorded, and an analysis phase during which differences in responses to different types of test stimuli are numerically quantified to calculate a statistical classifier for a categorical test result. The examiner may also provide the examinee an opportunity to explain any physiological responses and resolve any remaining inconsistencies.
 - 1.1.2 Evidentiary Examination: A polygraph examination in which the written and stated purpose agreed to by the parties involved is to provide a diagnostic opinion as evidence in a pending judicial proceeding.
 - 1.1.3 Paired Testing Examination: Polygraph examinations conducted in tandem on two or more individuals by different examiners who are mutually blind to the other test results regarding a single central contested fact to which all examinees are expected to know the truth thereof. Paired-testing is used by voluntary stipulation between the testifying parties to resolve disputed facts.
 - 1.1.4 Investigative Examination: A polygraph examination which is intended to supplement and/or assist an investigation and for which the examiner has not been informed and does not reasonably believe that the results of the examination will be tendered for admission as evidence in a court proceeding. Investigative examinations may be conducted for screening purposes or to investigate known allegations or known incidents.



- 1.1.5 Diagnostic examination: An event-specific evidentiary or investigative polygraph examination conducted to assist in determining the veracity of an examinee regarding his or her knowledge of or involvement in a reported issue or allegation. Diagnostic examinations may address a single aspect or multiple-facts of an event.
- 1.1.6 Screening examination: A polygraph examination conducted in the absence of a reported incident or allegation. Screening examinations may be conducted as single issue or multiple issue exams.
- 1.1.7 Test data analysis in polygraph refers to any structured method, whether manual or automated, for the evaluation and interpretation of the recorded physiological data in terms of probabilistic margins of uncertainty and/or categorical test decisions concerning the examinee's truthfulness or concealed knowledge. Decisions for diagnostic and screening examinations include:
- 1.1.7.1 Diagnostic Opinion: A professional opinion based on the results of a polygraph technique that meets the criterion validity requirements for evidentiary testing or paired testing. Results of deception tests can be described in terms of statistical significance, and are normally reported using the terms Deception Indicated, No Deception Indicated, Inconclusive, and No Opinion (DI or NDI, INC, or NO). Test results of recognition tests are normally reported using the terms Recognition Indicated, No Recognition Indicated, or No Opinion (RI, NRI, NO).
- 1.1.7.2 Screening Opinion: A professional opinion based on the results of a polygraph technique that meets the requirements for screening purposes; normally reported using the terms Significant Response, No Significant Response, Inconclusive, or No Opinion (SR, NSR, INC, or NO).
- 1.1.7.3 Polygraph Technique: A polygraph technique consists of a combination of: 1) a polygraph testing format for which there is a published description of test administration procedures that conforms to evidence-based principles for target selection, test question construction, and test administration; and 2) a published description of the test data analyses model, including physiological features, transformation, decision rules, and normative data.
- 1.1.7.3.1 Polygraph techniques for evidentiary examinations shall be those for which there exists at least two published empirical studies, original and replicated, demonstrating an unweighted average accuracy rate of 90% or greater excluding inconclusive results, which shall not exceed 20%.



- 1.1.7.3.2 Polygraph techniques for paired testing shall be those for which there exists at least two published empirical studies, original and replicated, demonstrating an unweighted average accuracy rate of 86% or greater, excluding inconclusive results, which shall not exceed 20%.
- 1.1.7.3.3 Polygraph techniques for investigative testing shall be those for which there exist at least two published empirical studies, original and replicated, demonstrating an unweighted average accuracy rate of 80% or greater, excluding inconclusive results, which shall not exceed 20%.
- 1.1.7.3.4 Polygraph techniques used for screening purposes shall be those for which there exist at least two published empirical studies, original and replicated, demonstrating an unweighted accuracy rate that is significantly greater than chance, and should be used in a “successive hurdles” approach which entails additional testing with validated methods when the screening test is not favorably resolved.
- 1.1.7.4 A Polygraph Examiner: a person who meets the training and education requirements as set forth in the APA Bylaws.
- 1.1.7.5 Post Conviction Sex Offender Testing (PCSOT) Examiner: a polygraph examiner who conducts examinations of sex offenders as a condition of treatment, probation, parole or supervised release, and who has completed specialized training consistent with APA standards.

1.2 Examiner Responsibilities

- 1.2.1 A polygraph examiner shall, where applicable, comply with all state continuing education requirements. Practicing examiners shall complete a minimum of 30 continuing education hours every two years in coursework related to the field of polygraphy. Examiners are responsible for maintaining their own records to document that they have met the continuing education requirement.
- 1.2.2 Examiners shall accurately represent their APA membership category, their academic credentials, licensure, and certification status.
- 1.2.3 Polygraph examiners conducting PCSOT tests shall complete at least half of the required 30 hours of continuing education in areas that pertain to the testing, treatment, or supervision of sex offenders.
- 1.2.4 The examiner should make reasonable efforts to determine that the examinee is a suitable candidate for polygraph testing. Basic inquiries into the medical and psychological condition of the examinee should be made where allowed by law. Mental, physical, or medical conditions of the



examinee that are observable by or reasonably known to the examiner should be considered when conducting and evaluating an examination.

1.3 Instrumentation and Recording

1.3.1 Polygraph examinations shall be conducted with properly functioning instrumentation that records with, at a minimum, the following physiological data:

1.3.1.1 Respiration patterns recorded by pneumograph components. Thoracic and abdominal patterns should be recorded separately, using two pneumograph components;

1.3.1.2 Electrodermal activity reflecting relative changes in the conductance or resistance of electrical current by the epidermal tissue;

1.3.1.3 Cardiovascular activity including changes in relative blood pressure, pulse rate, and pulse amplitude; and,

1.3.1.4 A seat activity sensor.

1.3.1.5 Other physiological data may also be recorded during testing, but may not be used to formulate probabilistic or categorical conclusions unless their validity is supported by replicated and published research.

1.3.2 Physiological recordings during each test shall be continuous and should be of sufficient amplitude to be easily readable by the examiner and any reviewing examiner.

1.4 Test Location and Conditions

1.4.1 The testing environment should be reasonably free from distractions.

1.4.2 Examiners conducting polygraph examinations during public viewing are prohibited from rendering opinions regarding the truthfulness of the examinees on the basis of these examinations. Examiners should ensure that reenactments of polygraph examinations are clearly conveyed as such to viewers. If the examiner determines that the reenactment will not or has not been clearly conveyed as a reenactment, the examiner shall immediately notify the APA National Office.

1.5 Preparation

1.5.1 Prior to an examination, the examiner shall dedicate sufficient time to identify and discuss the examination issues and potential problem areas.



1.6 Pretest Practices

- 1.6.1 The examiner shall obtain information sufficient to identify the examinee.
- 1.6.2 The examiner shall obtain the informed consent of the examinee prior to testing. It is recommended that the informed consent of the examinee be obtained after an overview of the polygraph process, including polygraph instrumentation and sensors, use of video/audio recording, issues to be discussed, requirements for cooperation during testing, and the need to report information and results to the referring professionals.
- 1.6.3 The examiner shall review all test questions prior to recording the physiological responses of the examinee.
- 1.6.4 The examiner shall conduct the examination in a neutral manner and shall not display or express any bias regarding the truthfulness of the examinee prior to the completion of testing.

1.7 Testing

- 1.7.1 A Member polygraph examiner shall use evidence-based validated testing techniques. For purposes of these standards, a testing technique shall be considered valid if supported by research conducted in accordance with the APA's research standards. Where examinations deviate from the protocols of a validated polygraph technique, the deviations should be explained in writing.
- 1.7.2 Nothing in these standards of practice shall be construed as preventing examiners and researchers from investigation and developing improved methods. Polygraph techniques that do not meet these standard for validation shall be considered experimental methods.
- 1.7.3 Field examiners who employ experimental techniques shall be in compliance with applicable law related to human subject research and should inform the examinee and the party requesting the examination of the use of any experimental techniques. Results from experimental techniques used in field settings shall not be used in isolation to render diagnostic or screening decisions.
- 1.7.4 Nothing in these standards of practice shall be construed as prohibiting the use of other supportive methodologies that do not meet the requirements of these standards (e.g.: Yes Test, Searching Peak of Tension, etc.). However, non-validated techniques shall not be used in isolation to render screening or diagnostic decisions



- 1.7.5 Examiners shall conduct an acquaintance test for all diagnostic, evidentiary, paired-testing, initial screening, and initial investigative examinations.
- 1.7.6 Questions used in the assessment of truth and deception shall be followed by time intervals of not less than 20 seconds from question onset to question onset.
- 1.7.7 Examiners should use standardized chart markings.
- 1.7.8 An audio and video recording of all phases of the exam shall be maintained as part of the examination files, consistent with agency policy, regulation or law, for a minimum of one year.
- 1.7.9 A member polygraph examiner shall not conduct more than four diagnostic or three evidentiary examinations in one day, and no more than five examinations of any type in one day.
- 1.7.10 Examiners who test sex offenders as a condition of treatment probation, parole or supervise release, shall have earned a certificate of training for a minimum of 40 hours of specialized instruction in post conviction testing, beyond the basic polygraph training course requirement, through a PCSOT trainer, curriculum and examination approved by the APA.

1.8 Scoring

- 1.8.1 Examiner conclusions and opinions shall be based on validated scoring methods and decision rules.
- 1.8.2 Examiner notes shall have sufficient clarity and precision so that another examiner could read them and replicate the analysis and conclusion.
- 1.8.3 Examiners shall not disclose or report the results of the examination until the analysis has been completed.
- 1.8.4 Examiners shall maintain the confidentiality of their work conducted until a release by the client is obtained.
- 1.8.5 An examiner subject to quality control review shall fully disclose all pertinent information regarding the case under review.

Updated March 11, 2016



APA ELECTION 2016

Join us!



*Keep us moving toward a
better future*

*Volunteer your time and
knowledge*

2016 APA Election Schedule

APA will hold its annual election for Board offices in July. If you are interested in running for office, please take note of the positions being voted this year:

President Elect (1 year)
Director 2 (2 years)
Director 4 (2 years)
Director 6 (2 years)
Director 7 (1 years)
Director 8 (2 year)

Applicants must specify which of the six offices he or she is a candidate. Candidates may run for only one office per year.

Below are important dates to remember

- **May 1 – May 31:** Period to submit nominations and self-nominations in writing to the National Office. Nominations must include a cover letter specifying for which office the candidate is vying.
- **June 1:** Last day to submit a candidate statement up to 500 words for the APA Magazine and the APA website (editor@polygraph.org)
- **June 1 – 7:** Validation of candidates' eligibility to hold APA office.
- **June 7:** Candidacy letters published in the order they were received on the APA website and in the APA Magazine.
- **July 2:** Email notification of elections (Ensure your email address is current on the APA website; www.polygraph.org)
- **July 3 – 9:** Electronic elections.
- **July 11:** Posting of results on the APA website.
- **July 31 – August 6:** Runoff elections, if necessary.
- **August 8:** Notification to winners. Posting of final election results.
- **September 1:** Officers sworn in at the APA Annual Banquet.

For additional information, contact Mark Handler at editor@polygraph.org or (859) 539-0705.

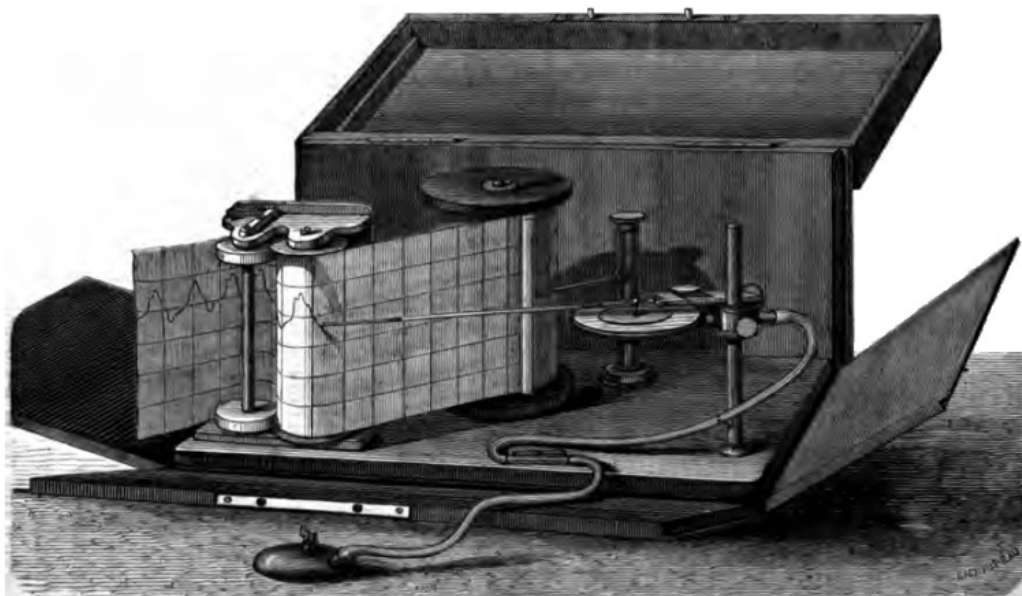
PNEUMOGRAPHS IN HISTORY

By Donald Krapohl¹

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As everyone should know, the sensors that went into the device that Keeler would dub the “polygraph” were not invented by him. All were commonly found in psychological and physiological research labs at most major universities, and all of them were developed in Europe decades before. In fact, Keeler, the “father of polygraph,” did not even invent the first portable polygraph, nor was he the first to polygraphically record physiology on chart paper. Celebrated French physiologist and researcher Étienne-Jules Marey preceded him by more than 50 years (See Figure. 1). As the illustration shows, Marey’s “polygraphe” could accommodate multiple data channels, and the entire assemblage fit in a carrying case.

Figure 1. Marey’s polygraphe. From: Marey, E.J. (1868). *Du Mouvements dans les Fonctions de la Vie*. p. 150. *Pneumographs in History*



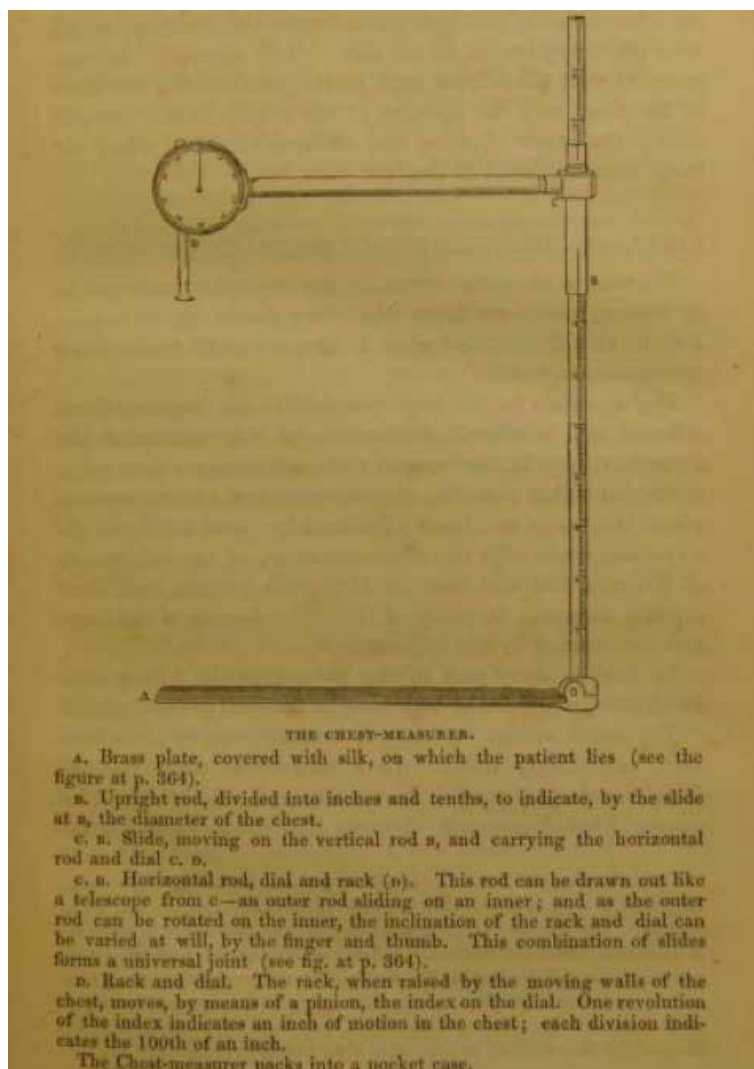
Polygraphe enregistrant le mouvement des différentes fonctions.

¹ The author is Past President of the American Polygraph Association, former editor of its publications, and co-author with Pamela Shaw of the 2015 Academic Press textbook *Fundamentals of Polygraph Practice*. He is currently the Director for Continuing Education with the Capital Center for Credibility Assessment (C3A) Corporation. APA-accredited polygraph schools desiring copies of the images used in this article should direct inquiries to donkrapohl@c3aCorp.com.



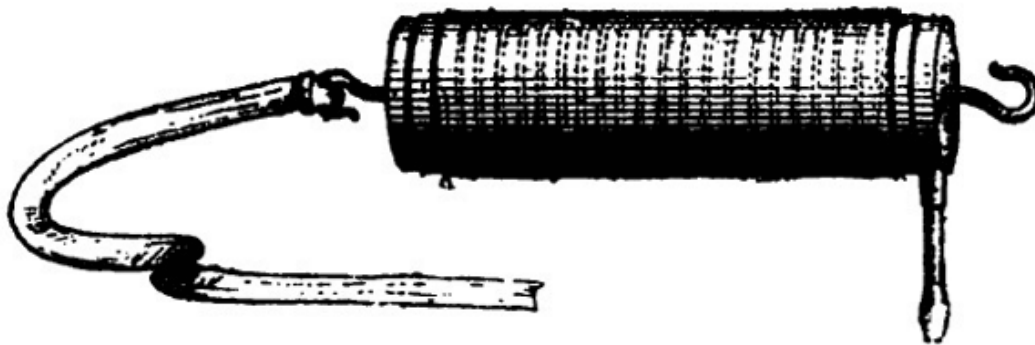
One of the sensors used on today's polygraph is the focus of this short article: the pneumograph. A device for monitoring the expansion and contraction of the chest has been around for a long time, even before there was a mechanism for recording these changes. Perhaps one of the earliest attempts was aptly called "The Chest-Measurer" (Figure 2). This 1848 technology provided precise measurements of the rises and falls of a patient's chest that accompany breathing. The movements were detected using a metal rod placed on the person's chest that transferred the undulations to a mechanism with a dial that displayed the measurements. The entire assembly was supported on a metal shaft that could be rotated so to permit the doctor to monitor inhalations and exhalations at different locations on the torso. The purpose was to help doctors quantify inhalations and exhalations in the diagnosis of disease. And it was small enough to fit in the doctor's traveling case.

Figure 2. The Chest-Measurer. From: Sibson, F. (1848). On the movements of respiration in disease, and on the use of a chest-measurer. In *Medico-Chirurgical Transactions*. p.3.



Continuous recording of respiration, indeed all physiological data, ultimately benefited from the development of the Ludwig's "kymographeon" and Marey's "polygraphe" a few years later. Both technologies allowed scientists to record physiological data in a permanent form and at a constant speed. Marey initially conceived and constructed a pneumograph sensor for his polygraphe that might look familiar to us today (Figure 3). It consisted of a metal spring covered in an air-tight rubber casing. It was held in place on the subject's chest with a satin ribbon that had been tied around the subject's torso. Expansion and contraction of the chest caused the pressure in the pneumograph sensor to change accordingly, and these changes were communicated through the hose to a tambour on which rested the recording pen. As the tambour's surface rose and fell with the changes in air pressure from the pneumograph sensor, the recording pen wrote representations of the subject's breathing on a medium.

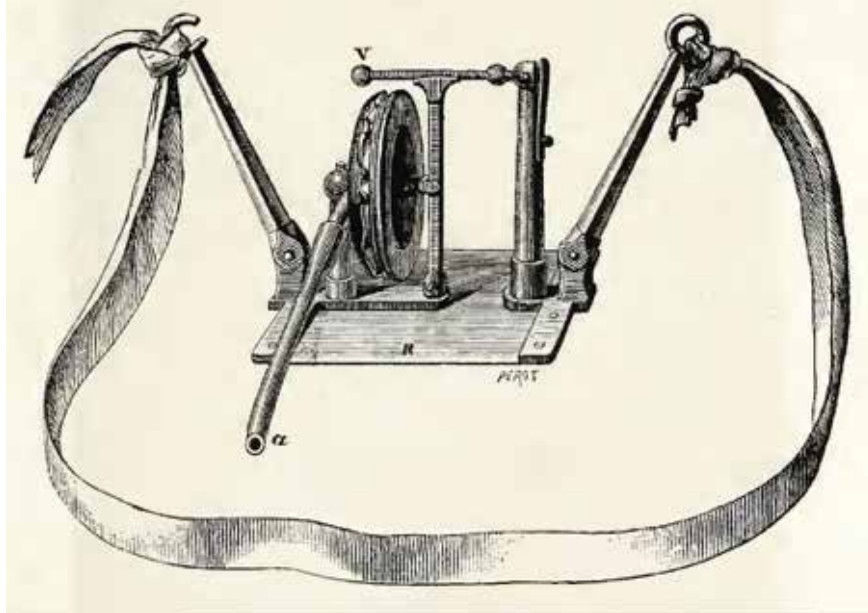
Figure 3. Marey's initial pneumograph sensor design. From: Marey, E.J. (1868). *Du Mouvement dans les Fonctions de la Vie*. p. 163.



Marey abandoned this initial approach in favor of a component that used tambours as sensors in order to transfer changes in torso girth to his polygraphe. This second system became known as the Marey pneumograph (Figure 4). It is not entirely clear why Marey moved away from the spring-in-tube method he originally conceived, as that sensor was simpler to construct, and involved fewer moving parts.



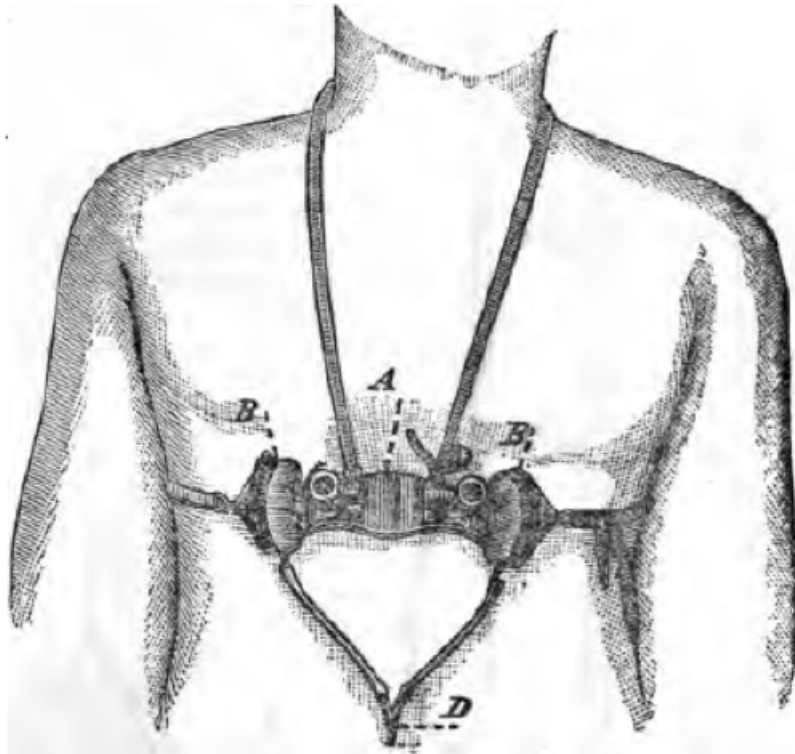
Figure 4. Marey pneumograph. From: Marey, E.J. (1885). *La Methode Graphique dans les Sciences Experimentales*. p. 203



Marey also designed a more sophisticated pneumograph for instrument manufacturer Verdin. The newer system had twin tambours that fed into a common rubber tube, and included a neck strap to help support its weight. The latter may have been added so that subjects could be recorded while they were in the seated or standing position.



Figure 5. Marey-devised pneumograph made by Verdin. From: MacDonald, A. (1899). *Experimental Study of Children*. p. 1154.



While Marey had a preference for tambours, others began to expand upon his original 1868 spring-in-tube design. For example, Fitz (Figure 6) added a metal tab to help keep the pneumograph from rolling up or down on the subject. He also replaced Marey's silk ribbon with a chain that went around the torso. Being lighter than any of the Marey tambour designs, it did not require a neck strap to support it on a sitting or standing subject. Similar designs were variously called the Harvard pneumograph and the Sumner pneumograph (Figure 7).



Figure 6. Fitz pneumograph. From: Fitz, G.W. (1896). A study of types of respiratory movements. In *Journal of Experimental Medicine*. p. 679

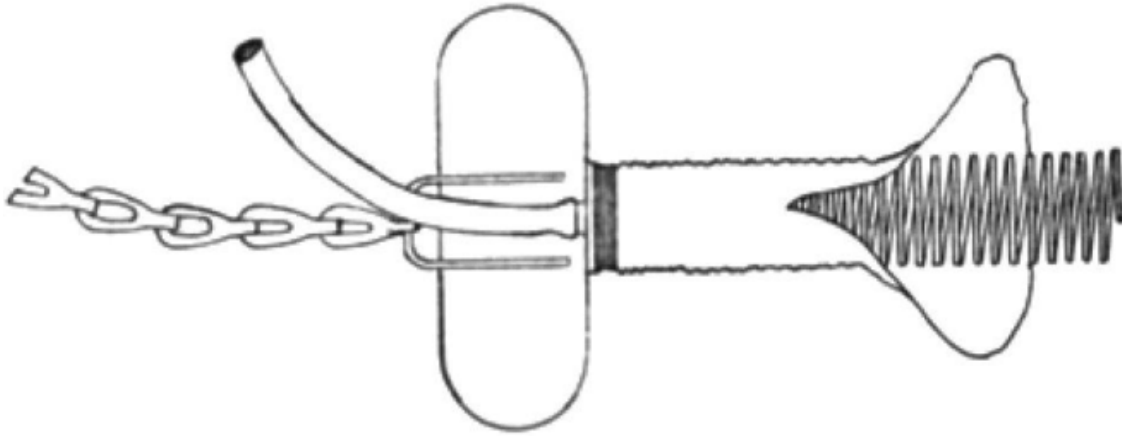
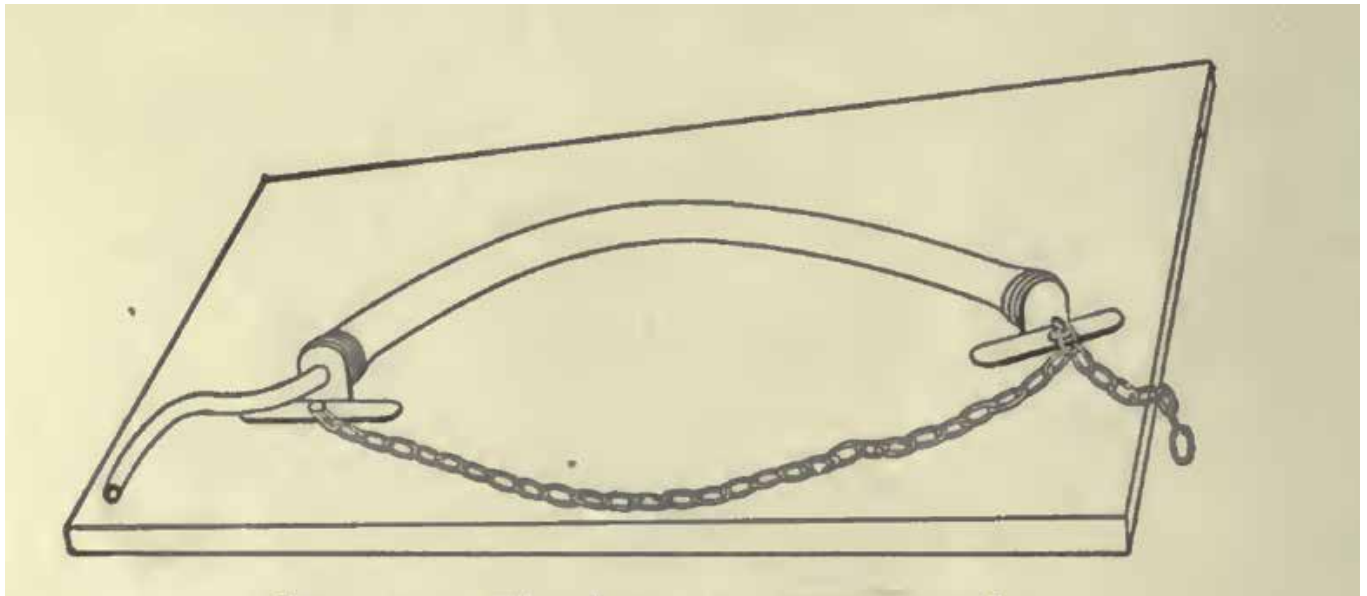
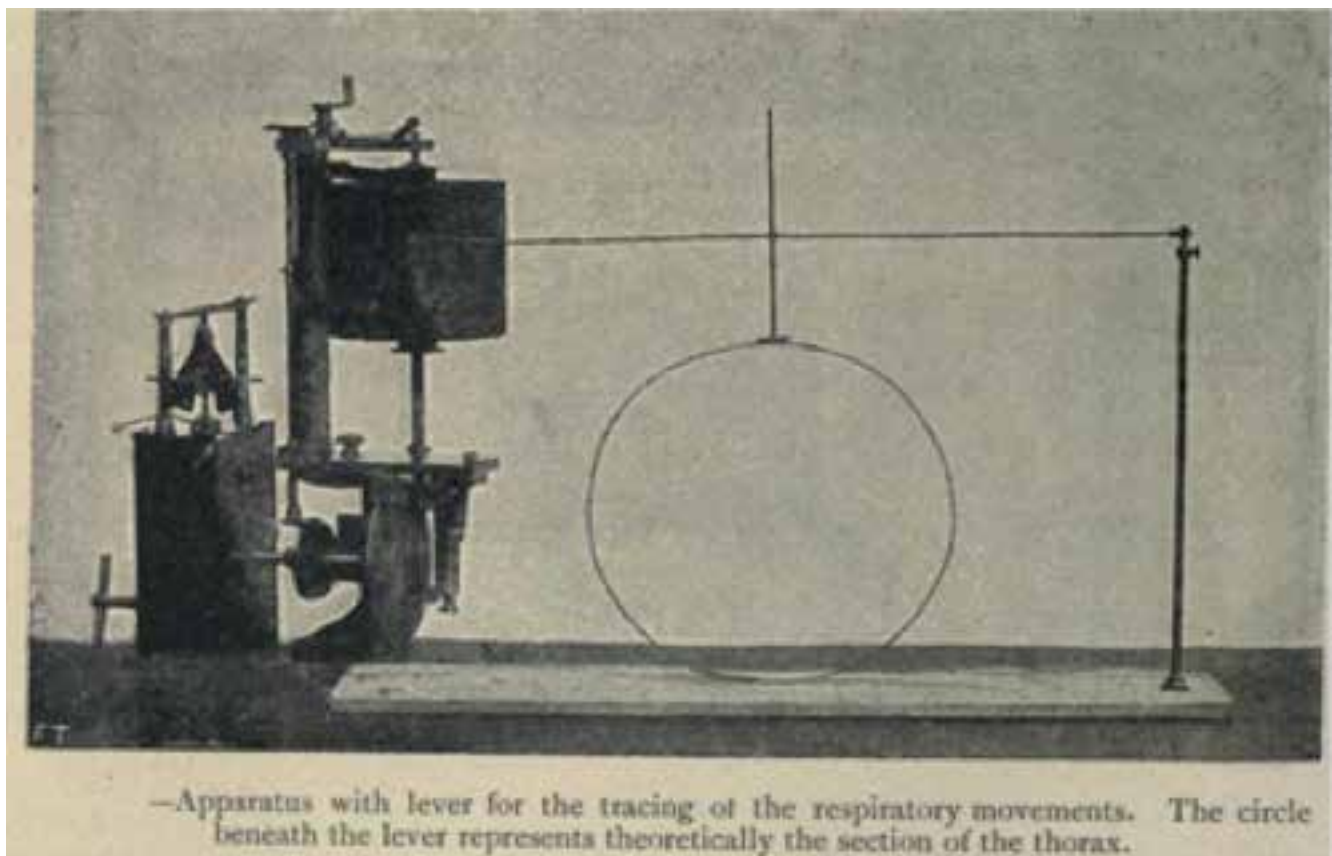


Figure 7. Sumner pneumograph. From: Titchener, E.B. (1918). *Experimental Psychology*, Vol 1. p. 184.



A final design is worthy of note, not so much because of its sophistication, but rather because of who the inventor was: Angelo Mosso. All basic polygraph instruction includes references to Dr. Mosso for his development of the scientific cradle to record physiological changes associated with fear. The oft-copied illustration of the scientific cradle from his 1886 text *La Peur: Etude Psycho-Physiologique* (p. 96 in the English translation) shows a prone subject lying on the balanced table, wearing sensors that included a Marey pneumograph. However, a dozen years later in his text on the effects of high elevation on physiology, Mosso shows a much simpler system wherein the subject lies beneath the recording pen, and the subject's chest directly moves the pen (Figure 8). Mosso made many successful recordings on soldiers who accompanied him to the high Alps specifically to assess the effect of elevation on various physiological systems.

Figure 8. The Mosso pneumograph. From: Mosso, A. (1898). *Life of Man on the High Alps*. p. 32.



That breathing should have been chosen early by John Larson while at the Berkeley Police Department for his groundbreaking studies on deception detection was not just a lucky guess. He would have known, as did other scientists of that era, that breathing could reveal whether certain stimuli were more salient than others. When the appropriate tests were later developed, breathing, along with other physiological channels,



would come to offer a way of distinguishing the guilty from the innocent. When the portable multi-channel physiological recorder was re-invented in the United States in the 1920s and applied to police work, it would forever transform how criminal investigations were conducted. While it may be tempting to view our computer polygraphs as technological marvels, we should recognize that most of the polygraph sensor technology is more than 100 years old, and in the case of the pneumograph, much older.



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la for solving a problem. A defined process will allow us to replicate the outcome objective with greater consistency. Perhaps more importantly, a process will also allow us to study and understand not just the outcome but the theoretical basis for the outcome. Having a well-defined process along with a well-developed theoretical basis will allow us to understand variation and error – and there is always some variation – in order to respond effectively to the potential for error. Options for responding to variation and error can range from strategic tolerance of error or corrective action to avoid or reduce error. An algorithm is simply a procedure intended to accomplish a goal and will involve both data and a procedure. An algorithm is therefore similar to a recipe, involving both ingredients and a procedure.

Consider this following example:

Raymond's Habanero-Cranberry Cookie Algorithm

Ingredients

- habanero peppers, fresh – 3 (chopped)
- cranberries – ½ cup (dried, chopped)
- flour – 2 ¾ cups
- sugar – 1 ½ cups
- butter – 1 cup (softened)
- vanilla extract – 1 tsp
- eggs – 2 (large)
- baking soda – 1 tsp

- salt – 1 tsp
- cinnamon – 1 tsp (ground)
- ginger – ½ tsp (ground)

Procedure

1. preheat oven to 325 degrees Fahrenheit
2. in a large bowl, combine the habanero peppers, cranberries, sugar, butter, vanilla, cinnamon, ginger and eggs
3. mix until smooth
4. in a second bowl, combine the flour, baking soda, and salt
5. stir the contents of the second bowl into the pepper mixture in the first bowl,
6. form cookies as rounded teaspoonful's of cookie dough on non-stick cookie sheets
7. bake for 10 minutes or until golden brown
8. cool to room temperature
9. enjoy with milk or coffee

Each of the ingredients in the habanero-cranberry cookie recipe will have a different theoretical and practical contribution to the algorithm and the objective. It will make no sense, and terrible cookies, to include all the ingredients in equal proportions as if they contribute to the objective. Algorithmically, each of the different ingredients can thought of as a different axis in a high-dimensional space. Careful measurement of the many ingredients and careful adherence to the algorithm-



mic procedures will produce a miraculous gastronomic delight of ginger, cinnamon and habanero fire. In contrast, a polygraph algorithm commonly involves data from three or four sensors in a three or four dimensional data space. But the ingredients must still be included in the correct proportions. The purpose of both the cookie recipe and the polygraph scoring algorithm is to achieve an optimal combination of the required ingredients in order to achieve a goal or solve a problem. Of course, polygraph scoring algorithms differ from cookie baking algorithms: the objective of the cookie algorithm is delicious cookies, while the objective of a polygraph scoring algorithm is to classify case observations as deceptive or truthful within an established tolerance for error.

Can we substitute ingredients?

There will always be some natural variation and error within a process or algorithm. Algorithmic process are improved by studying and reducing variation that can occur as a result of data quality, in addition to other variation that can result from imprecision in measurement or data acquisition. For example: if we wish to make sugar-free cookies through the substitution of an artificial sweetener in place of sugar, it is likely that the required volume of artificial sweetener will not be exactly the same as that for sugar. It is also possible that we may need to make other adjustments to the recipe when

we replace an ingredient. Similarly, if we want to substitute an ingredient with less saturated fat than butter, we may need to make corresponding adjustments to the other ingredients to achieve an optimal recipe that will give the same delicious cookies. Of course, the addition of another ingredient will change the character of the algorithm and result. For example: adding sunflower seeds to the habanero-cookie recipe will increase the crunchiness of the cookies and this can be expected to alter the manner in which they are consumed and experienced.

The same principle will be observed with a polygraph algorithm. Adding ingredients can change the character of an algorithm and result. And while it may be possible to substitute data ingredients, it can be expected to change the effectiveness of the algorithm result. Unless the correlation of the replacement data is near uniform with the replaced data, and unless the covariance matrix of all input data types is near uniform, we are not likely to observed unaltered algorithm performance. That is, if the operational or functional characteristics – the contribution of the replacement data and replaced data to the result, and the interaction of the ingredient with all other ingredients – are exactly the same, or nearly exactly the same, then it is possible that no adjustments will be needed to the overall recipe in terms of procedures and proportions of the other ingredients. Most often though



some re-evaluation and adjustment to the recipe will be needed when ingredients are substituted. Construction of an algorithm – whether a spicy cookie recipe or a polygraph scoring algorithm – is not a matter of guesswork *in situ*. The addition, exclusion, or replacement of sensor data cannot be accomplished easily without careful re-evaluation and re-validation of the decision model.

The most important concern is how each measured ingredient works in combination with the other ingredients to achieve the desired outcome or effect. Variation along each of the different ingredient axes will not have the same effect on the final product – in this case, tasty habanero cookies. For example: a 10% variation in the portion or volume of flour, butter or sugar may result in cookies that change from delicious to less delicious, but a 10% variation in habanero peppers might result in cookies that change from delicious to dangerous.

Polygraph Scoring Algorithms

Evaluation of polygraph test data in the early 20th century was a clinical procedure involving the observation of responses to relevant test stimuli that described various aspects of an issue under investigation. Continued development led first to the inclusion of comparison questions into the sequence of test questions (Reid, 1947; Summers, 1939), and later to the use

a simple nonparametric scaling methods (Likert, 1932) to improve the reliability and usefulness of numerical scores that are assigned via subjective visual judgement of whether greater changes in physiological activity are loaded at relevant or comparison stimuli (Backster, 1963; Kubis, 1962). Use of numerical scores allows for the calculation of empirical reference models that can be used for probabilistic inference and classification.

In practical terms, a typical polygraph decision model will include four basic parts (Nelson *et al.*, 2011):

- Scoring features
- Numerical transformations
- Statistical reference distributions
- Decision rules

In abstracted terms, a polygraph scoring algorithm is not different from many other testing algorithms, and consists of two fundamental parts: *inputs* and *operations*. In more practical terms these can be thought of as *feature extraction* and a *decision model*. These are analogous to the ingredients and procedures for a cookie baking recipe. Inputs to an algorithm will include both input *data*, obtained through feature extraction, and input *parameters*. Input parameters are decisions that must be made before an algorithm can be executed. For a polygraph scoring algorithm the input pa-



rameters will be things like the type of test (i.e., event-specific diagnostic exam or multiple-issue screening exam), the number of relevant stimuli, the number of repetitions of the stimulus sequence, the *alpha* level at which test results will be considered statistically significant, and the choice of decision rules, and whether to use of a statistical correction for multiplicity effects when using subtotal scores. In comparison, the input parameters for a cookie algorithm will be things like the oven temperature setting and the length of baking time.

Feature extraction is the process of evaluating the recorded data to identify the aspects of the data that are diagnostic. That is, which types of changes in physiological activity at relevant and comparison stimuli will contribute to the increased effectiveness of a decision model? Like many activities, the feature extraction task can be broken down further into smaller objectives: 1) identification of features that are correlated at statistically significant levels with deception and truth-telling, and 2) formulation of an optimal combination of these features. An optimal combination of scoring features is one that is parsimonious (i.e., is as simple as possible) and avoids redundancy or multicollinearity^I which can lead to overfitting the training and weak generalization

I Multicollinearity refers to a strong correlation between features so that one feature can be predicted by another with a high degree of accuracy.

of the algorithm to other data (Goldberg, 1991). The combined data from the feature extraction process is sometimes referred to as a structural model. When the structural model or statistical reference model.

When statistical reference distributions are developed through observation and analysis of empirical data the resulting distribution can be referred to as *empirical reference distribution*, and are sometimes referred to as *normative reference data* or *normative data*, or more simply as *reference norms*. The use of empirical reference distributions to evaluate polygraph data was first proposed by Barland (1985), and was first demonstrated in practical application by Krapohl and McManus (1999).

Development and validation of statistical reference can be accomplished in different ways, including the analysis of empirical data, and the analysis of theoretical assumptions that can be subjected to proof through the laws of mathematics. When statistical reference distributions are calculated as a matter of mathematical and logical facts they can be referred to as *theoretical distributions*^{II} (Strichartz, 1994).

II For example: a statistical reference distribution for the credibility assessment test known as the concealed information test is calculated as the probability mass and cumulative distribution for test scores under the null hypothesis that the scores are not loaded systematically as a function of deception and instead occur randomly. Resulting probability scores are therefore the probability that an innocent person might produce a similar or more significant score indicative of deception/guilt/recognition/involvement in the issue under investigation. Examples of



Another way to develop a model is to define procedural operations that can be executed automatically and repetitively by computers using structured input data and random variation, and these methods can include *Monte Carlo* methods, *bootstrapping* and statistical *machine learning*.

Reference distributions in polygraph testing, regardless of whether empirical or theoretical, are intended to serve as a model for deception and truth-telling. This is in recognition of the fact that a polygraph test does not measure or detect lies or deception per se. Instead, a polygraph test, like virtually all other tests, is intended to achieve a probabilistic measurement of a phenomenon that cannot be subject to simple and perfect deterministic observation or direct physical and linear measurement.

When we are reasonably sure our reference model provides us with a reproducible example of what can be expected from the population of interest, and when we know the mathematical form of the reference model, then we can use our knowledge of the statistical distribution to make inferences about the observed feature extraction data. The reference distribution is therefore a *model* that allows us to make inferences (i.e., conclusions or decisions) about the phenomena

or criterion for which the observed features and reference model are correlated.

Decision models for polygraph scoring algorithms are composed of the computation and mathematical procedures that are used to numerically code the data from the array of physiological sensors and then reduce the data from several repetitions of the sequence of test stimuli into a probabilistic classifier and categorical test result. Computation of simple algorithmic models, involving the addition of positive and negative integers, can be accomplished manually (Bell, Raskin, Honts & Kircher, 1999; Department of Defense, 2006; Nelson *et al.*, 2011; Weaver, 1980). However, automated computer algorithms offer the potential for using more powerful statistical models, and also provide calculations with automated reliability.

A number of polygraph scoring algorithms have been developed to provide both feature extraction and numerical transformations. Algorithms are sometimes identified by name or acronym, and include: Probability Analysis (Kircher and Raskin, 1988, 2002; Raskin, Kircher, Honts & Horowitz, 1988); Polyscore (Olsen, Harris, Capps, & Ansley, 1997), Objective Scoring System (Krapohl & McManus, 1999), and the Objective Scoring System version 3 (Nelson, Krapohl & Handler, 2008). Other algorithms have been described in publication though

theoretical distributions include the Gaussian, binomial, multinomial, Poisson, hypergeometric, power-law and other distributions.



not associated with a memorable name or acronym (Honts & Devitt, 1992; MacLaren & Krapohl, 2003).

Polygraph scoring algorithms past and present

Analysis of polygraph test data began as a matter of subjective professional or clinical expertise in the visual interpretation of responses to relevant test stimuli. Variability in polygraph data analysis led in time to an awareness in the importance of descriptive procedures and standardization. Inclusion of comparison stimuli in polygraph question sequences is premised on a recognition of three important concepts in scientific testing and scientific decision making: 1) scientific conclusions should be based on a reproducible analysis of data, 2) that all test data are made up of a combination of diagnostic or explained variance and uncontrolled or unexplained variance, and 3) that all scientific conclusions are relative to some alternative.

Scientific studies and statistical analysis have led to the reduction of polygraph feature extraction tasks to a standardized and robust set of responses that contribute most effectively to the goal of effective discrimination of deception and truth-telling. The application of signal detection, signal discrimination and statistical decision theory eventually led to even greater structure with increased reliability, and increased ability to pro-

duce statistical estimates of the probability of a correct or incorrect test result that are far more realistic than historical claims of infallibility. Standardization and structure led eventually to the potential for automation.

Reducing subjectivity and related sources of uncontrolled variance is among the main reasons for automating data analytic tasks, thereby increasing the reliability and reproducibility of results. An inability to automate a task is an indicator of insufficient and inadequate structure and standardization of a process. Manual analysis of polygraph test data, despite the application of decision theory and statistical reference distributions, remains high subjective in its reliance on visual feature extraction.

Different examiners relying on visual feature extraction methods may at times offer different interpretations of response onset and response end – especially with messy and complex data. Length of the time series scoring window, response onset window and latency period are additional areas in which different polygraph professionals may implement the rules and concepts in different subjective ways. There is also subjectivity in the selection of which comparison question to use when a choice exists. There is additional subjectivity in terms of artifact rejection, and this is related to subjectivity in the visual evaluation of data quality. Different examiners



might have a different level of sensitivity or tolerance for unstable and artifacted data. Some manual scoring methods include subjectivity in terms of the weight of the score assigned to response data for each physiological sensor. It is possible that different examiners can assign scores of different weight to the same pair of relevant and comparison stimuli. An automated solution would analyze what standardized rules will produce the best result for most people most of the time. Automated feature extraction could also be applied to the task of artifact detection, artifact rejection, and the analysis of data quality. It is a common use for machine algorithms to monitor a process for fault detection.

Although some form of statistical analysis can be accomplished on virtually any dataset, inclusion of comparison questions into polygraph test question sequences presented a simple and expedient method for numerically coding responses to polygraph stimuli. The tradition approach in the polygraph profession has been to visually scrutinize the data and assign nonparametric integer scores as a function of the comparison of changes in physiological activity at the relevant test stimuli with the changes in physiological activity at the comparison stimuli. Although it is tempting to use metaphorical concepts such as the *strength of reaction* and the *pattern of reaction* it is important to remember that no physical *strength* of any kind is

involved, and the *pattern* of interest is not the physical pattern of the graphical data but pattern of whether *greater changes* in physiological activity are loaded at relevant and comparison stimuli after multiple iterations of the sequence of test questions. Because psychophysiological data is inherently noisy, multiple presentation or iterations of the test stimuli are necessary to more effectively observe and interpret the loading and meaning of observed changes in physiological activity.

Numerical coding schemes for polygraph manual scoring algorithms have commonly involved the assignment of integer scores as a function of the comparison of changes in physiological activity at relevant and comparison stimuli. Data reduction is then a simple process of addition with positive and negative integers. These procedures were initially heavily dependent on subjective expertise developed through careful experience, rigorous training and ongoing practice. Kubis (1962) was first to publish a description of a nonparametric numerical scoring procedure for comparison question polygraph test data. Backster (1963) succeeded at integrating and popularizing the use of numerical scores in field practice, following the practices of Likert (1932).

There has been a persistent trend to toward increased structure, mechanistic test administration procedure, and



mathematical and statistical analysis of test data ever since Meehl (1954) showed that expert professionals relying on unstructured and unquantified clinical judgement are almost always outperformed by statistical linear models. As computers have become indispensable tools for data analysis, it was inevitable that there was inquiry into the application of automated computerized algorithms for the analysis of polygraph test data. Kubis (1962) is an early example of interest in the application of computer decision making to the polygraph test.

Over time, with increased evidence and knowledge about feature extraction and the application of statistical reference model to polygraph tests (Barland, 1985), polygraph scoring models have increased in both structure and simplicity to a degree that some polygraph scoring algorithm can be implemented either manually or through computer automation (Krapohl & McManus, 1990; Nelson *et al.*, 2011; Nelson & Blalock, 2016). Other computer algorithms rely on computational models that would be unpleasant to attempt to calculate manually (Honts & Devitt, 1992; Kircher and Raskin, 1988, 2002; MacLaren & Krapohl, 2003; Nelson, Krapohl & Handler, 2008; Olsen, Harris, Capps, & Ansley, 1997; Raskin, Kircher, Honts & Horowitz, 1988) and which are intended automated computer.

Information at this time suggests that

computerized polygraph scoring algorithms can be capable of equaling or exceeding the classification accuracy rates of experienced human polygraph examiners analyzing the data using traditional manual scoring procedures (Blackwell, 1998; Kircher & Raskin, 1988; Nelson, Krapohl & Handler, 2008; Raskin, Kircher, Honts & Horowitz, 1988). Computer algorithms offer the advantage of automated reliability that cannot be achieved through subjective visual feature extraction, and the potential for using mathematical and computational methods that are statistically more powerful than can be achieved by manual scoring protocols that rely on integer-based numerical transformations.

Automated computer algorithms offer less vulnerability to subjective bias, greater reproducibility of analytic results, and can more reliably implement the advanced mathematical and computational technologies including statistical and machine learning methods. However, the use of computer algorithms in the polygraph profession is inconsistent, with some accredited polygraph training programs and some polygraph field examiners still reluctant to learn to make use of advances offered by computerized scoring algorithms. Despite these advances, the polygraph profession has been slow to make use of computerized data analysis tools.



Why don't we use computerized polygraph scoring algorithms?

Resistance to the uptake of computer algorithm use in polygraph data analysis may have several contributing factors, including a lack of adequate published information about algorithm development, a lack of education and knowledge that permit appreciation and understanding of algorithms, and an ethical responsibility for human decision making. There is also the darker possibility that unscientific attitudes such as arrogance, egotism and “expertism” contribute towards a reluctant uptake of computer scoring algorithms in the polygraph profession. Finally, the most concerning possible reason for the avoidance of computer algorithms is that the polygraph is fundamentally unscientific or pseudoscientific (i.e., unscientific practices pretending to be scientific), in which case the success of the polygraph would actually depend solely on the subjective human judgement of the polygraph examiner.

Lack of adequate information about algorithms

One reason that polygraph field examiners may be reluctant to use computer algorithms may be a lack of knowledge about the development and validation of the computational models. When information is not available to field practitioners and program administrators, or when there is little interest

or incentive to learn about them, the effect may be perception of computer algorithm as a form of *black-box* with inputs and outputs for which human professionals operate without knowledge. The professional tension from this will be greatest when the result is not well understood, or unexpected, or appears inconsistent with subjective intuition or other information. In this case, the lack of information can lead to a rejection of analytic solutions and a restriction of decision making to models for which information is accessible to field practitioners.

The correct solution to this black box situation will be to make information and knowledge available to polygraph field examiners and program managers, in the form of published descriptions of algorithms including development, validation and computational models – and to provide incentive and requirements to learn about these technologies. When knowledge and information are not available, and when there is no incentive to learn, field practitioners faced with an expectation or obligation to account for test results may experience impulses to either reject algorithmic results arbitrarily, or to remediate knowledge deficiencies with inventive explanations that may begin to look mythological when they are eventually contrasted with the realities of algorithm design.



Ethical responsibility for human decision making

Blind reliance on computers, without human involvement in decision-making, can lead to ethical concerns or fears of a *Skynet* situation (referring to the fictional computer, in the Terminator movie franchise, that became self-aware and proceeded to make independent decisions about the value and future of the humans). Although fictional, the valuable lesson in the Skynet metaphor is that computer algorithms are designed to have goals. In the polygraph context these goals will involve optimizing certain aspects of test accuracy and constraining undesirable types of test errors to within acceptable levels.

Field practitioners faced with the responsibility to make categorical classifications about other persons may find it ethically preferable to base these decisions on methodologies that are within the scope of their own knowledge and understanding. It is, in reality, desirable that polygraph professionals carry a sense of personal responsibility for decision making.

The alternative, in which the field practitioner merely reports a machine generated result, with little understanding of how the machine achieved the result, little understanding about what data was used, and little understanding of the mathematical and computational procedures can be expected to

have little understanding about what can be reasonably said about an algorithm and test result. In this context, when making decisions that may affect the lives futures of other persons, there can be an inevitable desire to restrict decision making to rely only on the more limited technological solutions for which knowledge and information are available within the scope of a limited professional skill set.

An equally compelling ethical obligation faced by professionals of all types will be to learn to make use of advances and improvements in available technologies. Neglecting to do so will likely continued reluctance to make use of powerful analytic methods used in nearly every other field of scientific and professional work. Indeed, a deliberate choice to forgo the use of computer algorithms for polygraph data analysis, in favor of subjective manual scoring protocols that were innovative in the years prior to the widespread availability of desktop and handheld computers that can make use of the power, objectivity and reproducibility that can be achieved by evidence-based computer algorithms, can be expected to be viewed at some point in the future as ethically questionable by those outside the polygraph profession.

To make better use of the capabilities offered by presently available computing technologies, polygraph professionals should seek to acquire knowl-



edge and training in statistical and machine learning. Increased knowledge competency in scientific testing, classification and prediction models can contribute to more thoughtful discourse among field polygraph examiners and referring professionals about what can be reasonably said about the level of of certainty and uncertainty associated with polygraph test results. This can lead, in turn, to better informed policies that regulate the implementation and application of polygraph testing and polygraph test results to practical decisions involving risk assessment and risk management in probabilistic information contexts. Computers and algorithms are here to stay. The only remaining question is how human professionals can learn to make effective use of algorithms so that human decision making is not eventually completely replaced by computer decision making.

Unrealistic and naïve expectations for deterministic perfection

Some field examiners have explained their reluctance to use computer algorithms as a result of anecdotal experience in which the computer algorithm result was in disagreement with the result from manual analysis of the data. They neglect that anecdotal evidence is the weakest and most embarrassing form of scientific evidence, and further neglect that the correct responsible use of case anecdotes is not but attempt to reach conclusions

but only to illustrate extant knowledge and raise questions about extant knowledge. The dramatic details of these anecdotes are often selected and intended as an emotional and tangible anchor to a position in favor of traditional subjective manual analysis protocols over the use of computer scoring algorithms.

An abstracted and unemotional version of this argument is that we should not use computer algorithms simply because they are not perfect. Of course, this same argument has been offered as a rationale against the use of the polygraph itself – with the suggestion that the polygraph should not be used at all because of the potential for some proportion of testing errors. Underneath this simplistic rationale is a naïve and unscientific expectation for perfection, and a failure to understand that scientific tests are not expected to be infallible. Use of any scientific test always begins with a declaration of understanding of one's tolerance for error and uncertainty.

There will be some who attempt to assert that the margin or tolerance for error is zero, along with a corresponding desire to pretend that the polygraph test is or should be infallible. This is inconsistent with reality, for which an infallible or perfect classification method would require some form of deterministic observation that is completely unaffected by random variation and human behavior. In the



context of reality – which will include some observed testing errors - persons who desire to feign perfection as a professional marketing strategy can be expected to endorse attitudes that are inconsistent with science and test theory. Instead these persons can be expected to proffer the notion that infallible accuracy is obtained as a function of one's own high level of personal prowess or expertise as distinct from the professional capabilities of others and independent of replicable analytic analysis of data.

The purpose of a scientific test is to provide a reproducible evidence-based means to probabilistically quantify the margin of uncertainty or level of confidence associated with professional conclusions about a phenomena that cannot be subject to perfect deterministic observation or direct physical measurement. It should go without saying that any attempt to convey expectations that results any scientific test are infallible, or that results during the career-span of any individual professional have been infallible, are inconsistent with reality. Claims of certainty or infallibility should be regarded as charlatry. To professionals whose sense of professional value is constructed upon a fictional foundation of infallibility, computer algorithms, for which the results are known to be inherently probabilistic, are not just a source of confusion but a threat to their existence.

Egotism and subjective expertism

A more concerning reason than inadequate of knowledge and education will be the tendency for some field practitioners to enjoy the role of subjective expert. Marketing strategies in the polygraph profession have for decades emphasized the prowess of the examiner as a central feature of the effectiveness and validity of the test, at times even encouraging the perception that the polygraph is infallible or that their own unique skill has resulted in infallible decision accuracy over thousands of exam results. Polygraph professionals, whose market strategies have primarily involved expertism and assertions of infallibility, have at the same time marketed seeds of doubt about other polygraph professionals.

Although somewhat effective as a marketing strategy for individual professionals, the net result for the polygraph profession as a whole is that members of the public along with policy makers and scientific thinkers have sometimes been left with the impression that the polygraph profession may be unscientific arena driven more by narcissism and charisma than by the application of reproducible analytic models to data acquired through the use of valid scientific testing principles. For these professionals the marketing message is this: "I don't know if the polygraph is scientific, but I am an expert," despite the fact that expert



polygraph examiners have traditionally not been well trained in statistical decision making, and have expressed limited awareness of concepts central to frequentist inference (e.g., p-values, alpha boundaries, probability distributions, multiplicity, etc.) or Bayesian inference (e.g., prior probability distributions, conditional probabilities, cost functions, etc.) Some polygraph examiners have even verbally objected to the reporting of probabilistic test results with the argument that “it would be like telling people the test might be wrong.”

Parallel to expertise marketing is a current of selling seeds of doubt about other professional and economic competitors. The marketing meta-message is thus: “you need me and my expertise because you cannot trust those other professionals.” Reliance on computer algorithms for data analysis would have the unfortunate effect of leveling the field of expertise in data analysis, thereby devaluing the expertise of the polygraph examiner as a marketing strategy.

Reliance on algorithms would reduce the opportunity for subjectivity in data analysis and results. Some of subjective decisions might be made inarticulately or covertly, for example: in the selection of test optimization goals such as test sensitivity or test specificity, or the reduction of false-positive or false-negative errors. If polygraph field practitioners have learned to en-

joy or exploit subjectivity as a necessary component of their marketing and economic viability, or as a necessary component of the effectiveness of the polygraph test, then these professionals can be expected to remain strongly opposed to the use of objective algorithmic models which will require these decisions in a declarative, overt, and accountable manner.

Subjectivity in data analysis us to get away with running crappy tests with less exposure and vulnerability, and allows examiners to conduct examinations on marginally suitable or unsuitable examinees (for whom no published studies exist to describe the effectiveness and limitations of the test) without the inconvenience of accountability. Finally, although some expert examiners will point out that computer scoring algorithms cannot make use of data from badly conducted exams. They will point out that algorithms cannot conduct the test. This is, of course, the same as saying that the examiner still has to conduct the exam properly. It is the same as saying that we need adequate data. And while computer algorithms cannot score bad data or badly artifactual data effectively, neither can human examiners.

Proper data acquisition is a requirement whether data are analyzed manually or via automated computer algorithm. The requirement for proper test administration is not relieved simply



because the data will be subjected to automated analysis. Moreover, algorithms can be developed to address questions of data adequacy, including procedural compliance with testing protocols, quality and responsiveness of recorded physiological activity, and analysis of data artifacts. Artifact identification is simply another feature extraction and pattern recognition task that can also be automated via computer algorithm.

Marketing strategies based on expertise have been viable for the polygraph profession for a long time. This is primarily because the polygraph test itself has had no real competition in the form of a commercially available alternative scientific test for deception and truth-telling. Polygraph has had to compete only with itself, which means that polygraph professionals have traditionally competed professionally and economically only with other polygraph professionals.

With the introduction of other scientific tests for deception and truth-telling to the commercial marketplace, the polygraph technology and polygraph professionals will be faced with an increasing mandate to compete with newer scientific technologies. Those newer scientific technologies will successfully enter the commercial and economic lie-detection market only if they align themselves with scientific requirements such as objectivity, reproducibility, a realistic theoretical

basis, and the use of computer algorithms to analyze multi-variate data to make categorical classifications and probabilistic inferences. This will be done without apology for the probabilistic and imperfect nature of all scientific conclusions and scientific test results. Ultimately, polygraph professionals will be faced with the choice of learning to make use of computer algorithms or being replaced by computer algorithms.

Unscientific lie detection: use of the polygraph as a bogus-pipeline confession tool

Some polygraph field practitioners have placed such great value on the ability to obtain confessions that they may have devalued the test result itself. For these professionals the marketing meta-message can be characterized as: "it does not matter if the polygraph is scientific because I get confessions." There is no doubt about the practical value or usefulness of confessions. There is also no doubt about the sense of personal satisfaction and professional glory that can come from the resolution of an important case as a result of a confession.

Confessions are so intensely useful and so intensely gratifying that they can sometimes begin to usurp the entire purpose for the polygraph test. This will most apparent for professionals with little familiarity with the principles of scientific testing, whom may



tend to view the test result itself as useless unless it is accompanied by a confession.

The logic of this is more obviously problematic when we consider that these same professionals will also view the test result as useless when we have obtained a confession. The real effect is that the polygraph test result is useless to them regardless of whether an examinee does or does not confess. To these examiners, the polygraph test result is not merely useless and not merely confusing as to its probabilistic meaning, scientific validity, or investigative value. At its extreme, to these professionals, the test result can become a source of embarrassment.

If it is correct that the polygraph is nothing more than a tool for obtaining confessions, then the future of the polygraph profession is presently dimming. When scientific lie detection alternatives are commercially available, and when policy makers decide they want a scientific test result, an unscientific polygraph will not be satisfactory. In a context in which public policy makers will have increasingly available alternatives for scientific lie detection, avoidance of computer algorithms and continued confusion or avoidance around the polygraph test result itself, coupled with an obviously unrealistic impulse to pretend infallibility, will lead ultimately to widespread conclusions that the polygraph may deserve to become a historical

anachronism.

Conclusion

This paper has attempted to explain the basic concept of an algorithm as a structured process to achieve a goal. A simple example was shown in the form of a recipe for habanero-cranberry cookies, consisting of input ingredients and the procedure to bake the cookies. Polygraph scoring algorithms were described as consisting of several parts including feature extraction, numerical transformations and data reduction, a statistical reference model and structured decision rules. An algorithm is fundamentally a matter of input data, a structured process, and an output or result. Structure, which increases reliability, also enables the potential for automation, which enables the potential for making reliable use of more complex and powerful processes.

An effective algorithm will be one for which the correct result is reproducible. Evaluation of the effectiveness of cookie baking algorithm is accomplished by considering two simple questions. Did the ingredients turn into cookies? And, are the cookies delicious? Evaluation of a polygraph scoring algorithm, or any probabilistic classification algorithm, is also accomplished by two questions. What improvement over chance classification was observed when evaluating the data? And, what level of improvement



over chance classification accuracy can be generalized or expected when evaluating other data?

A data analytic algorithm will be based on a theory. The analytic theory of the polygraph test is that changes in physiological activity are loaded at relevant and comparison stimuli as a function of deception and truth-telling in response to the relevant stimuli. It is tempting to become sidetracked with esoteric and opinion-laden discussions about the nature of comparison stimuli and the nature of responses to comparison stimuli. To field practitioners, comparison stimuli are simply a basis of response against which responses to relevant stimuli can be interpreted more effectively. A correct approach to field practice will simply adhere to well-established technological solutions for test administration and data acquisition.

In contrast to field practice, theoretical discussions are of great importance to scientific research. An effective algorithm will allow us to understand what we are doing well enough to know what impact variation might have on the desired outcome. A bit like knowing the local streets well enough to take a detour when normal traffic is delayed. If we are not very familiar with the streets and the process and the objective, then it will be very easy to get off route and further delayed. Making changes to an algorithm without mathematical, statistical or empir-

ical evidence, and without regard for the structural and statistical model – regardless of the intention to make things better – will most likely result in a reduction of effectiveness. Effective change – defined as any change that brings the outcome closer to the objective – will require thoughtful attention to both the ingredients and the procedure for combining the ingredients in the correct proportions.

What will be the future of the polygraph if we don't learn to use computer algorithms?

Prediction is difficult, especially predicting the future^{III}. Current generations of young adult examinee and young polygraph professional may have never known a world without the internet. They have been targeted with advertising hyperbole since the day they were born. They can smell marketing hype from across a room, and they know how to use technology and information resources to obtain data and evaluate feedback from other consumers. Younger adult and younger professionals have come to rely on automation for everything from taxis to meal service to data analytics.

One thing can be predicted. Algorithms and new technologies and new algorithms will continue to change

III Sometimes attributed to Neils Bohr and to Yogi Berra, though it may have first been printed by Danish cartoonist Robert Storm Peterson.



our existing professions. Introduction of new technologies – especially automated machine algorithms can be very disruptive to any industry that relies on expensive human effort and expensive processes that are less reliable than is desired.

Any number of long-standing industries have already been substantially disrupted by the replacement human experts and less reliable traditional solutions with automated computer algorithms that can achieve similar or better results faster and with less expense: cameras and film processing, telephone switchboards, postal mail sorting, banking transactions, payments and invoices, shopping, typesetting, printing, book publication, magazines and periodicals, advertising, taxis, movie production and distribution, music production and distribution, map-making and navigation, new papers, television programming, travel agencies, radio, farming and ranching, tax accounting, job recruiting, manufacturing (3D printing), insurance, book stores, Real Estate, automobile sales, classified advertisements, direct mail marketing, phone books, and more.

Practically every area of human activity has seen the introduction of computer algorithms. Algorithms can now fly and land airplanes. Now we are observing the introduction of self-driving cars, and fleets of commercial trucks can drive themselves across Eu-

ropean countries. Virtually every area of professional and non-professional work can benefit from the use of computer algorithms. Even medical tests such as those for blood gases can be made more convenient, though not in all circumstances, by sensors and devices couples with calibrated algorithm. Polygraph examiners are deluding themselves if they think they not at risk for disruption if they do not learn to make use of computer algorithms.

In the end, humans like standardized and automated process. We also like our cookies best when they are baked by a caring human and not a soul-less machine. Toward that end, we would be wise to pay attention to experience with automation in commercial and industrial production. For example, Toyota automobile production teams use a Japanese concept called *Jidoka*, which is sometimes translated to mean “autonomation” or automation with human oversight. Ultimately, polygraph professionals, like all other professionals faced with data analytic tasks, will either need to learn to use computational and statistical machine algorithms or risk being replaced by computational algorithms.



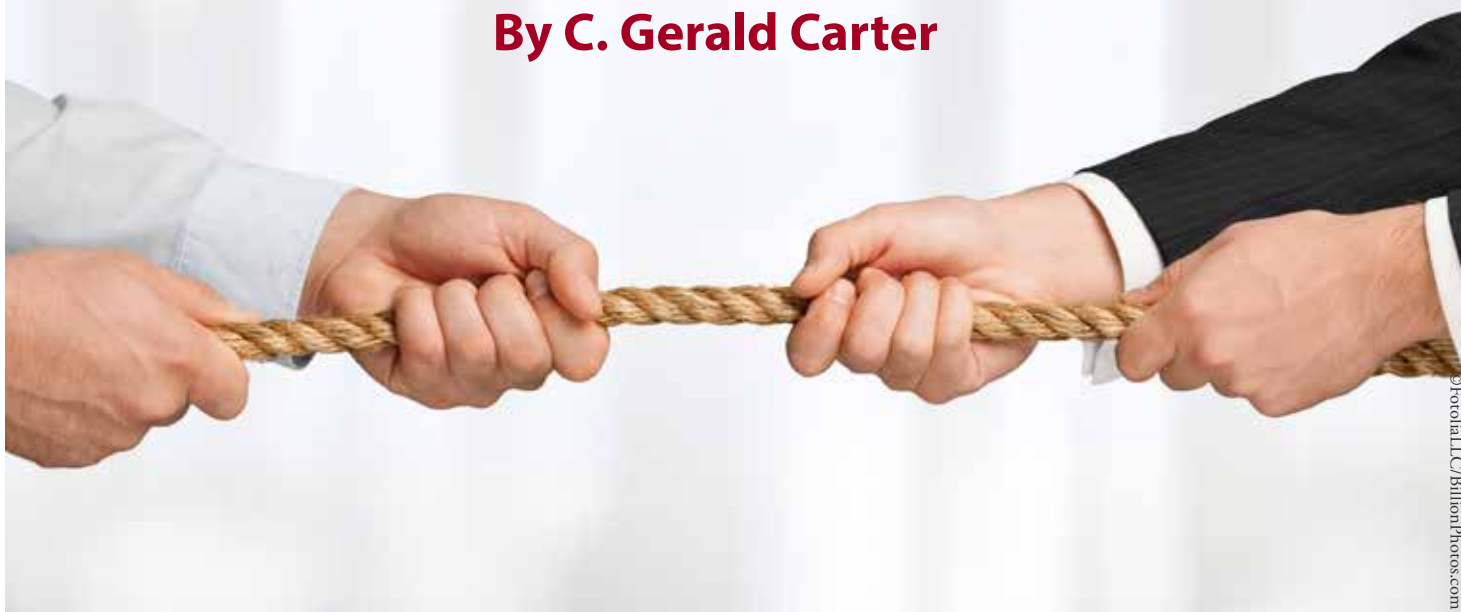
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College Fraternity or Research Based Profession?

By C. Gerald Carter



PROBLEM STATEMENT

This paper addresses the question of whether a professional polygraph association – state, national or global – should establish policies or guidelines related to court testimony by members regarding polygraph exams administered by other examiners.

I have been conducting polygraph examinations as a private examiner since 1980, during which time I have encountered my share of controversial issues. None of these issues had much of an impact on me personally until a recent challenge arising around my testimony in April, 2014 as a polygraph expert in a capital murder trial. It started when two defense attorneys

asked me to review a polygraph exam administered to their client by a police examiner.

In summary, my testimony was that the examination did not comply with a number of standard practices promoted in the profession as of January 1, 2009.¹ I further provided documentation to support my assertions. I expected a rebuttal witness or witnesses based on the fact that the prosecution had two polygraph examiners observing in the courtroom, one of whom was a member of the state polygraph board. The prosecution did not call any rebuttal witnesses to my knowledge.

¹ This was the date of the polygraph examination administered to the defendant.



Ironically, it was not the testimony I presented in the case that generated the controversy. The objection was stated in a meeting of our state polygraph association one month later proposing adoption of a new policy to define testimony by one member “against” another member as an ethical violation. Is this attitude current among members of the profession beyond my state?

Recently I attended a polygraph workshop sponsored by another state association which reinforced my new concern regarding ethical standards within our profession. During the course of his presentation the instructor admitted to having firsthand knowledge of a polygraph examiner in his department who intentionally falsified the results of a polygraph exam. According to the instructor, this examiner admitted to him personally that he falsified the results on a rape suspect in order to show deception on the test. The instructor told the audience made up of experienced examiners that he did not report the violation.

How many other tests has that examiner falsified and what impact might those actions have imposed on defendant verdicts? Why did this instructor, a professional examiner and role model for examiners, choose not to report a deliberate falsification of polygraph results? Why was he comfortable and

unapologetic when relating his story to a room full of examiners? This anecdote implies a lack of accountability within our profession that should cause us all concern.

The same instructor later asked for a show of hands of anyone who had critiqued another examiner’s work product in court. My hand was the only one raised. I held my own with the instructor, but I was caught off-guard, and I felt uncomfortable having to defend my ethical choices in contrast to those he seemed to be promoting in his presentation.

The concept of a profession implies that all practitioners deliver services that meet minimum quality standards or better. On that basis we should all administer exams that can hold up under quality review. We should welcome, not oppose, such oversight so long as it is delivered in a fair and impartial manner.

How prevalent are efforts to discourage examiners from performing quality reviews of work products provided by other examiners and contesting those in court? Such efforts may be formal, as in the resolution proposed to our state association, or informal, as in the training session referenced above. If judges become more inclined to allow polygraph evidence in court, will it be credible? Who will be



willing to review and assess the quality of exams, and with what impact to his or her professional status?

I believe this issue needs to be examined and discussed openly within our professional associations. In order for examiners to work as a profession under one umbrella, law enforcement and private examiners alike, our professional associations must openly support the integrity of our work product over solidarity among examiners. Only through a commitment to quality can we successfully arbitrate legitimate issues that arise regarding the practice.

CASE STUDY OF A CONTROVERSY

SITUATION

One month following the trial mentioned above, our state association convened its regular quarterly meeting. My testimony in that trial was that, in my opinion, a specific polygraph exam deviated from recommended practice. I expected my testimony would be an item for discussion. It was not listed as an item on the meeting agenda, but I wanted to participate in any discussion that was open to the membership.

On the day of the meeting I arrived early and was confronted by a long-standing member of the association board. He knew about the case but was not

interested in any details from my perspective. He indicated that the content of or basis for my testimony was not important. What was important, to him, was the fact that I testified “against” another member. He further stated that he had reviewed the charts in question and that his analysis was that there was nothing wrong with the charts. He was not interested in what I found regarding the examination process that established the basis for my court testimony.¹¹

Midway through the association meeting, this same board member proposed a new policy that would define testimony by one member of the association “against” another member of the association as an ethics violation. Put another way, the work of no member of the association could be challenged in court by another member of the association without the challenger being labeled professionally unethical.

He further requested that the president appoint a committee to draft the policy for consideration by the membership at a later date. He mentioned that “one member” had recently testified in opposition to an examination administered by another member and

11 In a recent news article, information was revealed that Justice Scalia and Justice Ginsburg were “best buddies.” They rarely found themselves on the same side of controversial issues. Hopefully, this teaches us the important lesson that we should disagree with ideas, not people.



he thought the association should address it in this way. He made no mention of the details of the case in question or the testimony. The president did appoint a committee at that meeting, but, as of submission of this paper, I have no official knowledge whether or not the association has taken any action.

To date I have found no other polygraph association that has a formal resolution defining court testimony in which one member questions procedures or outcomes of a polygraph exam administered by another member as an ethical violation under association policy. If my state association adopts such a resolution I believe it will be the first.

BACKGROUND

In order to support meaningful discussion of this controversy, I need to provide an overview of the case and testimony. No one outside of the courtroom has ever asked to see my testimony, before or after the proposal of a new policy. I believe that the facts of this case, along with my testimony, provide clear demonstration of the obligation for peer review when polygraph related evidence is admitted into court proceedings, criminal or civil. I hope this narrative also points to a possible way forward.

Case

The following points are based on an audio-video recording of the polygraph examination and separate documentation of the examiner's pretest notes, both of which were made available to the defense.

- The case involved the death of a four-month old baby girl on December 26, 2008. The victim was the daughter of the defendant.
- The prosecution alleged that the baby's death was due to "shaken baby syndrome" caused by the defendant, and he was charged with capital murder.
- The initial murder charge against the defendant was dismissed in 2009 after the victim's autopsy report said she had "natural abnormal vascularizations" and the cause of death was inconclusive. The state resurrected the case in 2010 after getting a second opinion that the victim died from brain injuries caused by someone shaking her.^{III}
- On January 1, 2009, a federal holiday, the defendant was given a polygraph examination by a po-

III Burkett, Seith. "Shaken Baby Defendant Guilty of Manslaughter." *Decatur Daily*, Friday, May 2, 2014.



lice examiner. The exam began at 4:00 PM. The defendant had been incarcerated since December 28, 2008.

- The pretest lasted 3 hours, 12 minutes and the entire exam took 4 hours and 18 minutes.
- During the post-test, the examiner informed the defendant that he had been deceptive on his polygraph examination. The defendant then stated that his daughter had fallen off the bed the night before her death and that he had picked her up and had put her down on the bed harder than he should have.
- Later in the post-test interview, after further questioning, the defendant emotionally stated that “he shook the piss out of her.” The prosecution defined this as “a confession” and it constituted the bulk of its case.
- After being appointed an attorney, the defendant recanted the statement that he ever shook his daughter.
- The prosecution requested the judge to allow them to play, for the jury, the segment of their recorded interview that captured the defendant’s statement – i.e. “confession” – that he “shook the

piss” out of the victim.

- The defense team agreed only if the prosecution played the entire video for the jury, believing it would force the prosecution to introduce polygraph evidence. The video clearly showed the polygraph equipment on the table where the admission was made. The defense team’s theory was that the defendant’s confession was due to an improperly conducted polygraph examination.
- The judge allowed the prosecution to show the confession to the jury but only in context of the almost four and one-half hour video which included pretest, posttest, examination, and other related polygraph evidence.

The jury found the defendant not guilty of capital murder but guilty of lesser charges. He was sentenced to serve 22 years in prison. The defendant appealed alleging that the polygraph examiner used interrogation tactics in the pretest. As of publication, this appeal is working its way through the court system.

Polygraph Testimony

Both of the defendant’s attorneys were court appointed. With approval from the judge, they employed me



to provide a quality control review of the polygraph examination. After reviewing the polygraph evidence, I decided to go beyond my polygraph experience and document whether the chart tracings were produced by best practice standards prevalent on January 1, 2009.

In my testimony, I concentrated on three main areas for review of the polygraph evidence. These were:

1. *Wording of relevant questions – major issue;*
2. *Physical and mental health of examinee; suitability as test subject – major issue; and*
3. *The length of the pretest - issue.*

I further committed to research and documented my testimony with articles from prominent researchers in the polygraph field.^{IV}

1. Wording of Relevant Questions

During the actual polygraph examination, relevant questions 1 and 2 were asked as follows:

1. Did you intentionally shake A... several times?
2. Did you intentionally shake A... several times while at your trailer last Friday?

During the pretest interview, the defendant never stated that he shook his daughter. The polygraph question is assuming that the defendant did shake his daughter. In this case scenario, “intentionally” is a state of mind and a non-testable item.

Furthermore, a written report submitted by the police examiner on January 2, 2009 listed the relevant questions asked during the examination administered to the defendant on January 1, 2009 as follows:

1. Did you shake A... several times?
2. Did you shake A... several times at your trailer last Friday?

Had the examiner used the original wording for the relevant questions he could have avoided the potential distortion created by the word “intentionally.”

2. Physical and mental health of examinee; suitability as a test subject

In the medical history, obtained and documented by the police examiner and provided to the defense, the defendant provided the following information:

^{IV} Court testimony notes and various articles are available to the reader upon request.



- His health was poor;
- He had a 10th grade education and his readings skills were limited;
- He had not eaten since breakfast (exam began at 4:00 p.m.);
- He slept on a mat in his jail cell and had only two (2) hours sleep the previous night;
- He was presently experiencing pain or discomfort; bad nerves:
- He has high blood pressure and was congested and that he has other general health problems described as bronchitis and “nerves;”;
- He had been admitted to a hospital in the past two (2) years for high blood pressure and a diabetic condition;
- He went to a free clinic one (1) month previously for anxiety; and
- His medications for high blood pressure, anxiety, diabetes and depression/bi polar had been withheld from him since December 28, 2008. He further stated that without his medications he had experienced panic attacks,

chest pains and “bad nerves.”

The examiner had enough information about the medical and mental history of the defendant to question whether he was a good candidate for a polygraph examination at that time. Given the defendant’s lack of sleep and food, and deprivation of medications, I would have rescheduled this subject for another day when those requirements had been met. No compelling reason was presented in court to test the defendant under the circumstances described.^V

3. Length of Pre Test

By my calculations, the length of the pre test was 3 hours and 12 minutes. Even though I could find no documentation on pretest time limits, the information needed to conduct a professional polygraph examination is normally obtained in a much shorter period of time. The trial Judge appeared to agree when he instructed jurors not to consider the alleged results of the defendant’s polygraph when determining whether he was guilty, only the role the hours-long polygraph process played in the statements he made to investigators.^{VI}

^V January 1, 2009 was a Thursday. According to the defense, the defendant was to be given a court appointed attorney on Monday, January 5, 2009.

^{VI} Burkett, Seith. “Shaken Baby Defendant Guilty of Manslaughter.” *Decatur Daily*, Friday, May 2, 2014.



Analysis: Why did this testimony create controversy?

Our professional associations have yet to define a common ethical code of conduct by which all members are obligated to comply; consequently, there is no single set of ethical requirements or assumptions under which we conduct polygraph exams.

This case study demonstrates that the author's common sense definition of a polygraph examination as "an effort to identify the truth regarding specific details related to a specific event or events through use of the polygraph instrument as a tool," which seems self-evident, is not universally accepted among licensed polygraph examiners and members of our professional associations. In this case, when measured against loyalty toward another individual member of the association, loyalty trumped truth on the balance scale for some members and leaders.

I found an interesting theory by German political scientist Elisabeth Noelle-Neumann that suggests an explanation.^{VII}

The relevance of Dr. Noelle-Neumann's theory for this case study depends on the fact that there are more than one

distinct sub-groups included under the umbrella of "licensed polygraph examiners." The first and largest sub-group of polygraph examiners consists of employees of law enforcement agencies, whether federal, state or local. The second consists of private examiners. Neither group is monolithic, but one characteristic of some private examiners creates a possible third or hybrid group. It includes examiners who work for both law enforcement, i.e. the prosecution side of the criminal justice system, and for defense lawyers. My practice falls within this hybrid definition and, I believe, allows me to offer a helpful perspective.

Dr. Noelle-Neumann refers to her theory as the Spiral of Silence^{VIII} which stipulates that individuals have a fear of isolation resulting from the fear that a social group or the society in general might isolate, neglect, or exclude members due to the members' opinions. This fear of isolation consequently leads to remaining silent instead of voicing opinions. Dr. Neumann (1974) introduced the "spiral of silence" as an attempt to explain in part how public opinion is formed.

The phrase "spiral of silence" actually refers to how people tend to remain

VII Elisabeth Noelle-Neumann (19 December 1916 – 25 March 2010) was a [German political scientist](#). Her most famous contribution is the model of the [spiral of silence](#), detailed in *The Spiral of Silence: Public Opinion – Our Social Skin*. The model is an explanation of how perceived [public opinion](#) can influence individual opinions or actions.

VIII Noelle-Neumann, E. (1991). *The theory of public opinion: The concept of the Spiral of Silence*. In J. A. Anderson (Ed.), *Communication Yearbook 14*, 256-287. Newbury Park, CA: Sage.



silent when they feel that their views are in the minority. The model is based on three premises:

- People have a “quasi-statistical organ,” a sixth-sense if you will, which allows them to know the prevailing public opinion, even without access to polls;
- People have a fear of isolation and know what behaviors will increase their likelihood of being socially isolated; and
- People are reticent to express their minority views, primarily out of fear of being isolated.

The closer a person believes the opinion held is similar to the prevailing public opinion, the more they are willing to openly disclose that opinion in public. Then, if public sentiment changes, the person will recognize that the opinion is less in favor and will be less willing to express that opinion publicly. As the perceived distance between public opinion and a person’s personal opinion grows, the more unlikely the person is to express their opinion.

My state association is made up of 80% or more of police examiners. There are approximately 8 to 10 private examiners.^{IX} In the quarterly meeting of

IX According to information received from the American Polygraph Association on February 18, 2016, there are 32 APA members from my state, to wit: 23 members are po-

my state association described above, only one member defended my actions in testifying against another examiner and he was one of that small group of private examiners. The other members either remained silent in the meeting or expressed whatever views they held outside of the meeting. Ironically, I also remained silent, further reinforcing Dr. Noelle-Neumann’s theory.

The “spiral of silence” theory provides one explanation for this behavior, but the ethical foundation for adopting the equivalent of a gag order as policy is flimsy.

RECOMMENDATIONS

I believe that identifying a problem implies a responsibility to propose one or more optional solutions. In that spirit, I suggest that the American Polygraph Association should consider developing a comprehensive professional code of conduct for advice and consent by its membership and, once adopted, should require all existing and new members to sign a compliance commitment.

As a first step toward increasing accountability, I believe that the issue of examiner testimony should be addressed as an ethical consideration requiring immediate attention, in ad-

lice examiners and 9 members are private examiners.



vance of work on the more comprehensive code.

At a minimum I propose that the APA adopt guidelines for conducting quality reviews of polygraph exams for court proceedings. My recommendations below are offered as a starting place for these conversations.

- The examiner must be experienced in the technique that he/she is testifying about and must demonstrate this fact to the court.
- The examiner must have reviewed all of the charts, reports, video etc personally.
- The examiner must have no actual or perceived conflict of interest in the outcome.
- The examiner should document his testimony using references from the professional polygraph literature.

CONCLUSION

If called upon to testify again in a similar situation, would I do it? My answer is an unequivocal yes. It was the right thing to do. Every person accused of a crime deserves a most vigorous defense. Since 1989, 1620 people have been exonerated from their wrongful convictions according to the National

Registry of Exonerations, a joint project of the University of Michigan and Northwestern University law schools. Verdicts based on “truth beyond a reasonable doubt” were proven false.

I am a better polygraph examiner and a better person for having testified as a polygraph expert. As examiners, we must always adhere to the concept that we are seekers of the truth – not interrogators! Every individual who walks into our polygraph suite is dependent on us to conduct a fair, objective and technically competent exam. Honoring their trust is our obligation and must always be our goal.

Because of the rarity of polygraph evidence being introduced in court, I do not expect to be called to testify again, whether for the defense or the prosecution. I believe, however, that it is the right and duty of any polygraph examiner to testify if the circumstances warrant. I chose not to fight the proposal in my state association. Rather I resigned my long standing membership in favor of resuming active membership in the American Polygraph Association where I have found more acceptance of open discussion and diverse ideas.

This decision was difficult for me but I found support from an unexpected source. A new Episcopal priest at the



church I attend reserves the first few minutes of the service to make announcements. One Sunday, during the height of this controversy, he walked in and read the following quote: "Seek the truth, come whence it may, cost what it will."^X He gave the name of the author and started the service. His sermon was not related to the quote. I was amazed by the implications that quote had for my situation.

That quote exemplifies the purpose of a polygraph examination. We are "Seekers of the Truth."^{XI} We owe that level of objectivity to every person

who walks into our polygraph suite. If I am such a seeker, I have to be willing to pay the cost.

If possible, I would like to see our associations begin to clarify whether the polygraph profession defines itself as primarily a "band of brothers" or as committed "seekers of the truth." Perhaps we can become both by defining a common ethical code to which we all commit and by which we can hold ourselves accountable. ^{XII}

X William Sparrow (Mar. 12, 1801-Jan. 17, 1874) was a leading evangelical theologian of this time. In 1841 he moved to the Virginia Theological Seminary, where he taught for the rest of his life. His primary areas of teaching were church history, theology, and Christian evidences. He served also for a while as dean. He is known for the advice he gave his students, "Seek the truth; come whence it may, cost what it will." Sparrow died in Alexandria, Virginia.

XI APA "Dedicated to Truth"; "NPA Truth Seekers"

XII Special thanks to Mr. Darryl Starks for taking the time to review an earlier draft of this article.



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Practicum

Advances are made by answering questions
Discoveries are made by questioning answers

On Testing Sex Related Alleged Offenses (Not related to PCSOT)

By Tuvya T. Amsel

Sex offense allegations have been probably around since early days of mankind. But since the 1970s, the area has undergone significant changes and reforms due to the implementation of new rules of evidence and procedure, new police methods and techniques, and new approaches to the investigation and prosecution of sex offenses^I.

Sex offenses are traditionally divided into three categories: (a) Sexual harassment, which ranges from degrading remarks, gestures, and jokes to indecent exposure, be-

ing touched, grabbed, pinched, or brushed against in a sexual way^{II}. In employment settings, it has been defined as “unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct that enters into employment decisions or conduct that unreasonably interferes with an individual’s work performance or creates an intimidating, hostile, or offensive working environment”^{III(b)} Sexual

II Hill, C. and Silva, E., (2006), Drawing the Line: Sexual Harassment on Campus, Washington, DG, American Association of University Women,

III Rubin, P., (1995), Civil Rights and Criminal Justice: Primer on Sexual harassment, Washington, DC, USDOJ, NCJ 156663

I <http://legal-dictionary.thefreedictionary.com/Sex+Offenses>

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.





assault refers to sexual contact or behavior that occurs without explicit consent of the complainant. Some forms of sexual assault include: Attempted rape, forcing a complainant to perform sexual acts, such as oral sex, fondling or unwanted sexual touching^{IV}. (c) Rape is defined by the FBI – Uniform Crime Reporting as: “Penetration, no matter how slight, of the vagina or anus with any body part or object, or oral penetration by a sex organ of another person, without the consent of the complainant.”^V

Motive – The perpetrator’s motive to commit sexual offenses are debated and explanations include various causes such as: anger, sadism, sexual satisfaction, psychopathy, etc., Contrary to the common belief that the primary motive for sexual assault is impulsive sexual desire, studies have found that the major motive is power and dominance utilizing sex as an implementing agent^{VI}.

Perpetrators - The majority of perpetrators are someone known to the complainant. According to data

IV <https://rainn.org/get-information/types-of-sexual-assault/sexual-assault>

V FBI, Uniform Crime Reporting, Washington, DC, December 2014

VI World Health Organization (WHO), (2014), Guidelines for medico-legal care for victims of sexual violence, Geneva. p.16



collected by the US Department of Justice: 82% of sexual assaults were committed by a non-stranger i.e. approximately 4 out of 5 of sexual assaults are committed by someone known to the complainant, 47% of rapists were a friend or acquaintance^{VII} subsequently sexual offense incidents between workplace coworkers and associates are very common.

Self-Exposure -The recent years' trend of self-exposure in public via social networks, tabloids, blogs and other type of media probably contributed to the public awareness of the phenomenon. Complainants are sharing in public, their stories of sexual harassment or sexual assault or rape committed by an acquaintance, by a coworker, family member or a colleague. In a number of those self-exposure described incidents the suspect is a well-known dignitary or celebrity. Anonymous suspects are of no interest to the publishers. The phenomenon is widely spread all over the world ^{VIII}and according to the World Health Organization: "Sexual violence is ubiquitous; it occurs in every culture, in all levels of society and in every country of the world. Data from country and local studies indicate that, in some parts of the world at least, one woman in ev-

ery five has suffered an attempted or completed rape by an intimate partner during her lifetime. Furthermore, up to one-third of women describe their first sexual experience as being forced. Although the vast majority of complainants are women, men and children of both sexes also experience sexual violence. Sexual violence can thus be regarded as a global problem, not only in the geographical sense but also in terms of age and sex."

And as a global problem, Israel is not excluded. Israelis are witnessing a sharply growing amount of complaints made by coworkers or colleagues against dignitaries charging them with sexual offenses. An Israeli Ex-President (currently serving 7 years in jail), generals (including 7 national police generals who were fired), Vice Prime Minister, CEOs, actors, reports, etc. are just a few who were exposed and who have paid for their unacceptable behavior. Many of the complainants avoid pressing criminal charges, and instead, use the media to expose the crime either because the offence occurred years ago (thus statute of limitation is applied) or because they do not want to go through the "humiliation and degeneration of cross examination that feels like being sexually assaulted all over again". Most of the described accusations took place in a private setting in which the com-

VII U.S. Department of Justice, National Crime Victimization Study: 2009-2013.

VIII <http://www.catalyst.org/knowledge/sex-discrimination-and-sexual-harassment-0>



plainants are unable to support their statement with evidence.

This “she said – he said” state of affairs calls many times for polygraph testing as a mean of verifying or rejecting the accusation. Often, the test results are “leaked” to the media by interested “high level unidentified sources”. And while the public is still trying to digest the news of the complainant’s polygraph test result, it is supplied immediately with the polygraph test result of the suspect. In this “trial by media” where the focus is on image rather than facts, partial reports of the test questions and results, or reporters’ imaginary description of the test and the questions that were asked, fuel the public confusion to the point of wondering: “How come they are both truthful?” When clearing the noise and dust surrounding such juicy cases, and after a cautious inspecting of the tests, an unfortunate reality emerges. Some of the examiners who conduct those tests, either on purpose or out of ignorance, performed poorly and unprofessionally. Questions that are: poorly phrased, off track, contaminated, etc. “generous” numerical scoring along with a “profound belief in the presumption of innocence” lead to requested favorable results.

Possible Contaminating Factors

Testing sex complainants and suspects present two major difficulties: the complainants’ mental fragility and in many instances the blurred understanding of the situation when the encounter itself is not denied but the minor details are hazy. These situations import into the test complications that may contaminate the results.

Stress effects on memory

When interviewing a complainant or a suspect regarding an incident we figuratively enter her/his brain and recall or retrieve the event yet, research found that the “excavated” information is contaminated and distorted and not necessarily reflects the accurate event’s details. First it can be contaminated while the information was encoded, then stored and later when it was retrieved. The expression “losing one’s head” which is also used in the context of sex related incidents suggest that discretion, common sense and logic are being replaced by lust, impulse, fear, anger etc. The complainants are usually frightened and/or stressed, during the event experiencing fight or flight psychophysiological responses while the suspect is sexually aroused creating a blood rush, increase in heart beat and blood pressure, etc. these responses bear an effect on their memory^{IX}. Once

IX Schwabe, L., Joëls, M., Roozendaal, B., Wolf, O.T., Oitzl, M.S., (2011), Stress effects on memory: An update and



the event is over, feelings, thoughts and assumptions incorporate into the memory creating a **new** memory of the event. Needless to say that in those instances when the complainants were exposed to a sedative drug such as GHB and alike the memory almost vanishes. So when retrieving the incident the reported information was already altered. As a result two (or more) witnesses of the same incident may describe it differently.

Another issue that should be considered by the examiner is the repressed memory and false memory” “Repressed memory occurs when trauma is too severe to be kept in conscious memory, and is removed by repression or dissociation or both. At some later time it may be recalled, often under innocuous circumstances, and reappears in conscious memory. False memory occurs when a vulnerable patient with a history of over compliant or highly suggestible behavior is unwittingly coached by a respected authority figure to create, as if in memory, an experience that never actually occurred”^X The issue of repressed memory is highly controversial and some leading scientists in the area such as Professor Elizabeth Loftus are questioning

its existence: “These new developments give rise to a number of questions: (a) How common is it for memories of child abuse to be repressed? ... (b) When the memories surface, what are they like? and (c) How authentic are the memories?”^{XI} . The existence of the controversy surrounding the issue probably impacted legislators in some states to prohibit law enforcement agencies to perform such tests: “Several states such as New York have enacted laws that prohibit law enforcement agencies and district attorneys from requiring any complainant of a sexual assault to take a polygraph examination as a prerequisite to initiating a criminal investigation..., and in some states the prohibition is absolute ...”^{XII} Therefore it is highly recommended not to test a complainant concerning an incident that s/he experienced as a child and regardless to update yourself with the legal status in your state.

Complainants - One key concern when testing sexual assault complainants is Post Traumatic Stress Disorder (PTSD). PTSD symptoms may result when a traumatic event causes an over-reactive adrenaline response, which creates deep neurological patterns in the brain.

integration Neuroscience and Biobehavioral Reviews, July 2011.

X Lego S., (1996), Repressed memory and false memory, Arch Psychiatr Nurs.,10(2), 110-115.

XI Loftus, E. F., (1993), The Reality of Repressed Memories, American Psychologist, 48, 518-537

XII Matte, J.A., (1996),” Forensic Psychophysiology Using the Polygraph”, J.A.M Publications, Williamsville, NY 625



These patterns can persist long after the event that triggered the fear, making an individual hyper-responsive to future fearful situations^{XIII}. Symptoms of PTSD include repeated thoughts of the assault; memories and nightmares; avoidance of thoughts, feelings, and situations related to the assault; and increased arousal (for example difficulty sleeping and concentrating, jumpiness, irritability). Rothbaum & al (1992) found that 94% of women experienced PTSD symptoms during the two weeks immediately following the rape^{XIV}. Rothbaum and Foa (1992) reported that about 30% of complainants were still reporting PTSD symptoms nine months later^{XV}. According to Mayo Clinic: "Post-traumatic stress disorder symptoms may start within three months of a traumatic event, but sometimes symptoms may not appear until years after the event"^{XVI}. With some of the complainants, the PTSD symptoms are enhanced

by irrational guilt feelings that they may somehow have contributed to the offense.

The main concern when testing the sexual assault complainants is that the description of the incident during the pretest may ignite a flashback of the occurrence and the relevant questions that follows will trigger the PTSD symptoms leading to a false positive outcome. Therefore, examiners should avoid asking direct relevant questions such as: "Did you have sexual intercourse with X? and alike and instead perform a confirmatory type test in where the complainant will be asked to write a statement describing the incident and then the relevant question might be: "Have you lied in any of the details described in your statement?" Please note there is no known research to support this statement approach. If the complainant filed, the complaint to a police officer than the relevant question could be: "Have you falsely reported that incident to the police?"

Consensual sexual intercourse or contact – On those instances in where a person claim to have sexual intercourse or sexual contact with another person while the alleged partner bluntly denies having any sexual intercourse or sexual contact either because s/he has some form of authority over the complainant such as: boss, teacher, etc. (exploiting au-

XIII Rothschild, Babette (2000). *The Body Remembers: The Psychophysiology of Trauma and Trauma Treatment*. New York: W.W. Norton & Company.

XIV Rothbaum, B. O., Foa, E. B., Riggs, D. S., Murdock, T., & Walsh, W. (1992). A prospective examination of post-traumatic stress disorder in rape victims. *Journal of Traumatic Stress, 5*, 455-475.

XV Rothbaum, B. O. & Foa, E. B. (1992). Subtypes of posttraumatic stress disorder and duration of symptoms. In J. R. T. Davidson & E. B. Foa (Eds.) *Posttraumatic Stress Disorder: DSM-IV and Beyond*. American Psychiatric Press: Washington, DC, 23-36.

XVI <http://www.mayoclinic.org/diseases-conditions/post-traumatic-stress-disorder/basics/symptoms/con-20022540>



thority) or the alleged perpetrator wants to avoid the consequences of the relationship if published. e.g. President Clinton: "I did not have sexual relations with that woman"^{XVII} "the test is relatively simple and the relevant question could be: "Have you had any sexual intercourse (or contact) with John / Jane?"

Nonconsensual sexual intercourse or contact – When the complainants claim of being raped or sexually assaulted or touched by an acquaintance THE most common defense used by the suspect is that the intercourse or contact was consensual. Examiners should keep in mind that there are instances in where the complainant did not want to be engaged in the act s/he only thought of it without verbally or nonverbally expressing it or sometimes even if s/he did so the objection was so insignificant that it passed unnoticed by the suspect. So in order to avoid false outcomes, the examiner must avoid using words such as "raped" or "forced" or "assault" and alike because these words might be interpreted differently by each and every examinee. Instead the questions should be phrased: "Did you hear X say she wanted you to stop having sex? " and "Have you noticed that s/he is objecting physically of having sex with you?" while the complainant

should be asked: "Have you objected verbally to the act?" or "Have you objected nonverbally/physically to the act?" or just plug into the relevant question the words ("Have you told him "I don't want to have sex with you"?) or the description that s/he gave ("Have you pushed him away from you?").

Sexually vs. Friendly contact – Another type of allegations are those in where the complainant claims that s/he was touched with a sexual intent while the suspect admits the contact but claims that it was "a friendly touch" or "just to draw her/his attention" or "accidental contact" or a "fatherly hug" "an innocent kiss on the cheek" and alike. This type of allegation calls for a mind reader rather than for a polygraph examiner based on an old rule set by Reid and Inbau: "Polygraph test questions should concern factual information; they should not be based upon opinions. ... or "desires" or "intentions" ^{XVIII}. The practice of testing intentions is to convert the intention into acts and turn them into relevant questions is inappropriate in this instance. By default the examiner should avoid conducting such tests because suppose the suspect had no sexual intention yet, if at one point a sexual thought crossed her/his mind regarding the complainant that may contaminate

XVII Clinton, Bill. Response to the Lewinsky Allegations, Miller Center of Public Affairs, 26 January 1998.

XVIII Reid J.E., Inbau F.E (1977), Truth and Deception, The Williams & Wilkins Co., Baltimore, p. 26



the test to the point of a false result.

Verbal sexual harassment - When a complainant accuses someone of making sexual statements while the suspect denies, the relevant question should be: "Did you hear her/him say: "..."? "Have you said: "...?" The problem arises when the suspect uses the "I do not recall ..." excuse. The solution to such situation (as well as other similar situation) may be to examine the veracity of the suspect's statement by asking: "Do you say that you don't remember in order to avoid the truth?" or "Do you use "I don't remember" as an excuse?". Although it does not resolve the accusation it does give a direction.

Testing sex offenses – some recommendations

- If possible the complainant and suspect should both be tested in order to reduce false results (for an expanded explanation, see the APA Marin Protocol^{XIX})
- Before phrasing the questions the examiner should acquire as much as possible details – to the smallest detail – of what happened, in order to avoid contaminated questions.
- If the examinee is hesitant or un-

certain regarding a specific detail avoid testing on it.

- Display outmost sensitivity - A discussion about sexual matters with a stranger is annoying, uncomfortable and irritating regardless of the speaker's veracity. Examiners should be sensitive and understanding and have the outmost patience when conducting such tests.
- Let the examinee set the rhythm when describing the occurrence – don't push
- It is strongly suggested that both examiner and examinee will be of the same gender. Discussing such matters with an opposite gender are more embracing.



XIX Marin, J. (2000a). He Said / She Said: Polygraph Evidence in Court. *Polygraph*, 29(4) 299-304.





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By Damilola Sholademi

Nigeria has an illustrious reputation of having a huge population of about 150 million people and close to 400 ethnic groups and sits comfortably as the country with far the highest population on the African continent. The population of the country is made up of three major ethnic groups namely: the Hausa, Yoruba and the Igbos – and

they represent around 70 per cent of the population.

Another 10 per cent comprises of several other groups numbering more than 1 million members each, including the Fulani, Kanuri, Tiv, Ijaw and Ibibio. More than 300 smaller ethnic groups account for the remaining 20 per cent of the population.



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The Economic And Financial Crimes Commission

The preponderance of economic and financial crimes like Advance Fee Fraud, money laundering, illegal oil bunkering etc., has had severe negative consequences on Nigeria, including decreased direct foreign investments in the country and a blemishing of Nigeria's national image. The menace of these crimes and the recognition of the magnitude and gravity of the situation led to the establishment of the Economic and Financial Crimes Commission (EFCC), the foremost anti-corruption agency not only in Nigeria, but on the African continent.

The Commission is empowered to prevent, investigate, and prosecute

economic and financial crimes and is charged with the responsibility of enforcing the provisions of other laws and regulations relating to economic and financial crimes.

The Directorate Of Internal Affairs And The Establishment Of The Polygraph Unit

It is also pertinent to point out that the Polygraph Unit of the Commission is domiciled within the Directorate of Internal Affairs which, as the name implies, was established by the previous Chairman of the Commission Mr. Ibrahim Lamorde, to perform regulatory and oversight functions to the operatives and other staff of the Commission.

The EFCC's Polygraph Unit was established in 2013 as part of the efforts to strengthen and increase the DIA's capacity to effectively deliver on its mandate. As experts of the polygraph profession, we will no doubt agree that the polygraph comes highly recommended as a veritable internal affairs investigation tool. There is no gainsaying the fact that over the years, both law enforcement and other regular agencies both in and out of government have used polygraph for pre-employment screening and many other needful uses. The story of the EFCC in this wise is no different. This,



of course is in addition to the many instances that the Commission has used polygraph in the investigation of economic and financial crimes.

Six pioneer would-be examiners were trained at the American International Institute of Polygraph, Georgia, USA in the summer of 2013 under the tutelage of Mr. Charles Slupski.

These officers have coordinated and carried out all the EFCC's Polygraph Examinations from 2013 till date; ranging from pre-employment, administrative to criminal and National Security Screening examinations.

Our Activities

The EFCC core areas of investigation and Polygraph use include but are not limited to:

- Advance Fee Fraud
- Economic Governance
- Banking Fraud
- Land and Property Fraud
- Crude oil Theft/Extractive Industry Fraud
- Intelligence and Special Operations Section
- Counter-terrorism and General Investigations
- Pre-employment Screening
- Internal Affairs Investigation, etc

Although the polygraph team has

conducted several criminal and administrative examinations both for the operations side of the Commission and the Directorate of Internal Affairs, it has achieved most of its resounding successes in the area of pre-employment screening which has not only saved the Commission, and by extension, the government of Nigeria huge sums of money, but has also stopped corrupt and potentially dangerous elements from slipping through the cracks and into the system.

Successes

On May 13, 2015, Polygraph examiners from the Economic and Financial Crimes Commission, EFCC, tendered the results of polygraph tests conducted on Mrs. Rosulu Idowu Oluronke, a former Lagos State Court Registrar standing trial for allegedly defrauding a former Chief of Army Staff, Gen. Ishaya Bamaïyi of \$300,000. The court ruled in favor of the prosecution in December, 2015. The defendant was sentenced to a jail term of ten (10) years on two count charges of fraud.

There is an on-going sensitization of lawyers and investigators regarding the use of the Polygraph in criminal prosecutions; the frequency of tests conducted has also increased as a result of the sensitization





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Challenges

Within the short period of the existence of the polygraph unit, some noticeable issues have militated against the astronomical rise in the fortunes of the profession in the country. These issues include the following:

- I. **Skeptic Population:** A large percentage of the Nigerian population is grossly suspicious of the Polygraph and may only readily take the test after it has been repeatedly tested in the country over time.
- II. **One Judicial Precedence:** In the last three years, only one polygraph test result has been admitted in evidence in a criminal case; albeit on the first try; the court ruled in favor of the prosecution,

hence, recording our first criminal conviction.

III. **Low Rate of Willing Examinees:** Other than pre-employment test candidates, most subjects in administrative and criminal cases turn down the Polygraph Examination.

IV. There are currently less than ten (10) known Polygraph Examiners in the Nigeria; this low 'examiner-client' ratio has also impacted on the low acceptance of Polygraph in the Country.

Prospects

The above mentioned challenges are not insurmountable. Indeed, this budding stage of the development of Polygraph in Nigeria actually presents



wonderful opportunities to shape, direct and protect the growth and future of Polygraph practice in Nigeria. It is highly anticipated that the coming years will be prosperous for polygraph in Nigeria for some reasons outlined below:

- The EFCC's Polygraph Examiners are at the forefront of this movement within Nigeria.
- Increase in the frequency of Polygraph use as a tool in criminal cases and expert witness testimony in court as opposed to the 'isolated case' since the inception of Polygraph in Nigeria.
- It will serve as a tool to solve our current National Security challenges.
- It will also create an enabling environment for the private sector Polygraph practice.
- We are currently propagating the use of Polygraph in Nigeria and to ensure it becomes standard practice in all Law Enforcement Agencies in Nigeria.

Establishment Of The Polygraph Association Of Nigeria

The Commission's Polygraph Examiners have been in the forefront of the registration or a national association within the country that serves as an

umbrella organization for polygraph experts and activities within the country. This association is called the POLYGRAPH ASSOCIATION OF NIGERIA, and we intend to affiliate it with the American Polygraph Association when the documentation is concluded.

Conclusion

The journey of polygraph in Nigeria is a long but steady one. The American Polygraph Association affords us further and better opportunity of acquiring more skills that no doubt, will be a needed boost for the profession in Nigeria, and indeed the African continent. It is anticipated that the use of Polygraph in both civil and criminal cases in court would increase exponentially in Nigeria in the within the next few years, considering its ever-pressing need in our court system; Polygraph is currently admissible in Nigerian courts if tendered as 'Expert Testimony' or 'Electronic Evidence' as provided for by the Nigerian Evidence Act, 2011. I believe we can make this profession take its pivotal place of pride as a necessary tool for the advancement of humanity.





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Wrongful Convictions and Miscarriages of Justice



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Book Review: *Wrongful Convictions and Miscarriages of Justice: Causes and Remedies in North American and European Criminal Justice Systems (Criminology and Justice Studies)* edited by C. Ronald Huff and Martin Killias. Publisher: Routledge; 1 edition (February 28, 2013) ISBN-10: 0415539951 ISBN-13: 978-0415539951

Written by: Mark Handler

I had an opportunity to read an electronic copy of this book recently. As with other books on this subject for which I have written reviews, I point out my belief that polygraph examiners are in a unique position to curtail some of the practices that lead to these sad situations. Often the polygraph examiner is the first “neutral party” a criminal suspect encounters during an investigation. I have heard many a tale from the field from examiners who were asked to “get this

guy to confess”, only to emerge from a test with non-deceptive charts. One of the primary reasons this phenomenon occurs is because examiners are not (hopefully) relying on convention-based, error prone credibility assessment tools. Today’s examiners are using scientifically validated techniques that unyoke their decision making process from their “gut feelings” which perform at chance levels at best.



So why read these books, or study these errors? Because they help us continue to realize mistakes get made and remind us of the dire consequences. The 5th century BC. Chinese military strategist Sun-Tzu is credited with writing, "Know thy self, know thy enemy. A thousand battles, a thousand victories." Wrongful convictions and miscarriages of justice are an enemy of a good criminal justice system. If we learn vicariously through the mistakes of others about this enemy, we can improve the system.

The book is divided into three sections, each containing a chapter or chapters related to that section. Section one is dedicated to considering the causes and frequencies of wrongful convictions. It includes; Wrongful Convictions in a World of Miscarriages of Justice by Brian Forst. This chapter describes different types of miscarriages and makes estimates of the magnitudes of each. Forst provides some thoughtful insight into the costs of these errors to the wrongfully convicted and to society as a whole.

Samuel Gross tackles a thorny issue of estimating the number of wrongful convictions that occur. He uses some clever approaches to estimate lower and upper bands of frequencies. I found it interesting how the results of several different methods tend to converge on the 3-5% range. If one were to multiply the total number of incarcerated people by 3-5%, the numbers (and cost) become staggering. Martin

Killias, one of the editors, looks at the differences between an accusatorial system (like the United States) and an inquisitorial system (such as found in Europe.) He compares and contrasts the pros and cons and shows that ultimately the accusatorial system results in a more exonerations. He offers some insight into why moving towards a more inquisitorial model might reduce wrongful convictions.

One of the best chapters I found was one written by Brandon Garrett titled "Trial and Error". Professor Garrett outlines some of the errors in the post-convicted exonerations he studied for his book. He writes that the evidence presented to the juries seemed solid at the time. Only through the hindsight of reviewing all the trial were the main categories of errors discovered. They include; lying informants testifying, bad eyewitness identification procedures, poor police interview and interrogation practices, and bad lawyering from both the defense and prosecution side. He provides examples of each that will leave you shaking your head wondering how this could happen here. Jim and Nancy Petro do yeoman's work of explaining the prosecutor-wrongful conviction conundrum. The prosecutor is arguably the most powerful player in the criminal justice system. They decide who gets charged, what to charge, who gets a plea bargain offer, what type of offer they get, who gets investigated, who gets subpoe-



naed, and much more. Since 95% of criminal cases in the United States are resolved by plea bargain, the prosecutor becomes judge, jury and execution in most cases. Jim Petro was the Attorney General of Ohio from 2003 through 2007. He became involved in the Innocence Project during that tenure when he came to the aid of a wrongfully convicted Clarence Elkins. Petro became dismayed at the tenacity with which the prosecutor in the case fought to keep Elkins' defense team from reviewing his convictions. Despite DNA evidence excluding Elkins the DA fought to sustain Elkins conviction. Elkins was eventually released but unfortunately while he was serving time the real culprit went on to commit three child rapes while innocent Elkins served time in prison. Petro describes the great challenges prosecutors face from serving their constituents to serving the criminal justice system. Power can corrupt and absolute power can corrupt absolutely we see from a number of examples provided in the chapter. Finally, the Petros discuss recent changes to laws about prosecutorial immunity.

Simon Cole and William Thompson write a chapter on Forensic Science and wrongful convictions. Forensic science has contributed to wrongful convictions but it has also been used to expose them. DNA analysis has played a major role in identifying wrongful convictions and was the crack in the dam that forced the crim-

inal justice system to confront this demon. For years' cognitive dissonance kept many public safety officials from acknowledging the existence of wrongful convictions. Unfortunately, forensic science has been abused and overused and is one of the greatest contributors to wrongful convictions. Vuille, Biederman and Taroni use the Amanda Cox murder case as a backdrop for discussing DNA profiling, and misunderstanding of scientific results. While no malfeasance may be intended, a lack of understanding or inability to explain scientific results can have disastrous outcomes. Triers of fact count on expert witnesses to help them understand scientific material to supposedly inform his or her decision-making processes. When those results are exaggerated, twisted, incorrectly conveyed, or worse yet manufactured, it corrupts the system.

One of the more introspective chapters was Brants' chapter on tunnel vision, perseverance and confirmation bias. Professor Brants' used four major exoneration cases from the Netherlands as examples for these human decision-making heuristics. She does a nice job of breaking down each heuristic and citing real world examples. She offers some safeguards to help prevent them. Aebi and Campistol have a chapter on the little discussed "voluntary" false confession that leads to wrongful conviction. Most false confession discussion centers on the coerced or pressurized compliant or



internalized variants. These authors review research on the voluntary false confession. As could be predicted they mostly occurred to protect another person (juveniles or terrorist cases), though some occurred to promote legislative changes (assisted suicide, for example). Kathryn Campbell pens a short chapter on preventive detention following the 9/11 tragedy. She discusses wrongful detentions associated with suspected terrorists in the United States and Canada. I found this an interesting chapter where one contemplates individual liberty versus national security interests. Whatever side of the fence you find yourself on in this debate, the “War on Terror” is not over. We can probably benefit from a hindsight review of the actions we took. Which actions worked (and should be kept), which did not and should be abandoned.

The most eye-opening chapter was the concluding one in Part 1, Gwladys Gillieron’s chapter on Plea Bargains in the United States and Summary Proceedings in the European model. In 2010, more than 97% of state and federal criminal cases were resolved through plea bargaining in the United States. In Europe the percentage was slightly less (around 90%) but still staggering. If one were to think about the number of criminal cases in the United States alone, 97% being “settled” sets a stage fraught with the potential for a wrongful conviction. Especially when one considers that in the United

States it is legal to threaten more severe consequences should a subject be found guilty, after deciding to go to trial versus plea bargain (Bordenkircher v. Hayes, 1978:363). There is an obvious concern that an innocent person would take the offered deal rather than run the risk of a much harsher sentence. Add to this that most states and the federal system require a defendant to waive their right to appeal as a part of the plea agreement.

Part 2 centers on consequences and remedies for wrongful convictions. One of the more disturbing chapters was Westervelt and Cook’s examination of the aftermath of a wrongful conviction. Most of us believe in a fair world and probably just assume that exonerees are adequately compensated and helped to reintegrate into society. Unfortunately, the truth is many are not. Based on in-depth interviews with 18 death row exonerees, the authors paint a very tragic picture of lives shattered and for the most part irreparable. They have an immediate problem of securing a place to live, food, medical care, transportation, learning new technologies, living outside of a prison environment, and much more. For the most part they all reported their familial relationships ruined, non-existent or difficult at best. Most were diagnosed with some degree of post-traumatic stress disorder that severely impairs their ability to start life over.

Ken Roach writes a chapter on rem-



edies for wrongful convictions in the United States and Canada. His thesis is that Canada provides fewer formal legal remedies for wrongful conviction, but is more amenable to considering new evidence in these cases, than is the United States. He argues the United States system often demands a proof of actual innocence, in addition to the additional evidence. This proof requirement makes the prospect of a new hearing in the United States less likely. The chapter is a really good primer for learning about the post-conviction relief appeals process in both countries. Lappas and Loftus offer a chapter on “The Rocky Road to Reform- State Innocence Studies and the Pennsylvania Story). They use the plight of wrongfully convicted Thomas Doswell as the backdrop for describing Pennsylvania’s state Senate’s attempt to create an Advisory Committee to study the underlying causes of wrongful convictions. This committee became a battleground where law enforcement and prosecutors fought with the other members over reform recommendations. The Pennsylvania District Attorneys Association took an active role against the work of the committee. In September, 2011, the committee produced a 316-page report detailing its findings and recommendations for reform. Two hours later the Pennsylvania District Attorneys Association released their own report condemning the Advisory Committee report. Given the enormous power of district attorneys, without their sup-

port the recommendations of the Advisory Committee were likely to fall on deaf ears. There is a small chapter on a man named Edwin Borchard, written by Marvin Zalman. Borchard is often cited as one of the early scholars who wrote about wrongful convictions.

The final chapter of Part 2 is Ronald Huff’s discussion on challenges to reform. He starts by stating the following about the first 301 post-conviction DNA exonerations:

Eighteen of the 301 were sentenced to death.

The average time served before exoneration was about 14 years.

About 70% of these exonerees were people of color.

DNA identified the actual perpetrator in about half of these cases.

People have been exonerated in 35 states and the District of Columbia.

These cases are only the ones for which we had DNA to exonerate them, a point Roach makes when calling them “the tip of the iceberg”. 90 plus percent of criminal cases do not have DNA to examine. Roach describes the aftermath of two sensational cases:

“The Guilford Four” from the 1974 bombing of two pubs in Guilford, England spent up to 15 years in prison before being found innocent and released.



“The Birmingham Six” Hugh Callaghan, Patrick Joseph Hill, Gerard Hunter, Richard McIlkenny, William Power and John Walker—sentenced to life imprisonment in 1975 in England for the Birmingham pub bombings. Their convictions were declared unsafe and unsatisfactory and quashed by the Court of Appeal on 14 March 1991 after serving up to 16 years in prison.

A forensic psychiatrist, Adrian Grounds, conducted clinical assessments of the 11 wrongfully convicted who served prison terms ranging from 4 to 16 years (mean = 12). On the average they were 30 years old when they went to prison and 42 upon release. He describes his assessment as “wholly unexpected”. He reports patterns of severe psychological problems that disabled these people from living normal lives. He said they were similar to former hostages and survivors of natural disasters. He described enduring personality changes including; estrangement, loss of a capacity for intimacy, moodiness, inability to stabilize, loss of sense of purpose and a loss of initiative and direction. Most were diagnosed with post-traumatic stress disorder. Many of the immediate families also suffered significant psychological problems related to their wrongful incarceration. The documented human suffering from these two cases alone should give us cause to pause and figure out lessons

learned to hopefully reduce a chance of repeating the errors.

Part 3 is a one-chapter conclusion and recommendation chapter by the editors. Killias and Huff review;

What is a “wrongful” conviction and how to use a thoughtful consideration of “wrongful to expand our thinking about these errors.

Estimating the enormity of the problem. Even if we get 97% of the cases right, that still leaves a lot of potential for innocent people to lose their liberty.

A summary of our current knowledge of the causes of wrongful convictions and some potential remedies to reduce these.

The role of the most important players in the criminal justice system, the prosecutors. Only with prosecutorial consideration will these reforms be effective. Criminal justice systems have developed such that the prosecutors are in THE key role to help institute reforms that will work.

Consequences of the wrongful convictions to both the exonerees and society as a whole. When a person is wrongfully convicted, the real “bad guy” gets away and often does more harm on society. Also the cost to the families of the exonerees should be considered when weighing pros and cons of reform.

Finally, they close with possible remedies to begin to reform the parts of the criminal justice system that are most likely related to wrongful convictions. The major sources (the Big Three) are; using jailhouse informants, contaminated confessions and eye-witness misidentification. Others do contribute (bad lawyering by either prosecutors or the defense attorney) but the Big Three are responsible for the “lion’s share” of the errors.

Ultimately they close the book with the recommendation that made me pick the book up in the first place- education of police officers to improve their professional performance. They note that professional law enforcement officers are often one of the first to embrace positive change. As a polygraph examiner you probably have found yourself (or inevitably will be) placed in an uncomfortable position where you have to provide your consumer

with “bad news”. That news being this person’s test result is inconsistent with their expectations. While it is “only” a test result, we should remember it is still the best test available for veracity assessment. Many of you are functioning daily in law enforcement and get to have an impact on the outcome of the investigation. I don’t doubt that most agencies have excellent investigators referring your cases. But sometimes, just sometimes, they are victims of human decision making heuristics that create tunnel vision. By having some understanding of when, where, why and how things can go wrong you are a wiser advocate for them, for your agency and for society. In closing I highly recommend this book to anyone who has the potential to come into contact with anyone facing a potential incarceration.

Carl Friedrich Wilhelm Ludwig



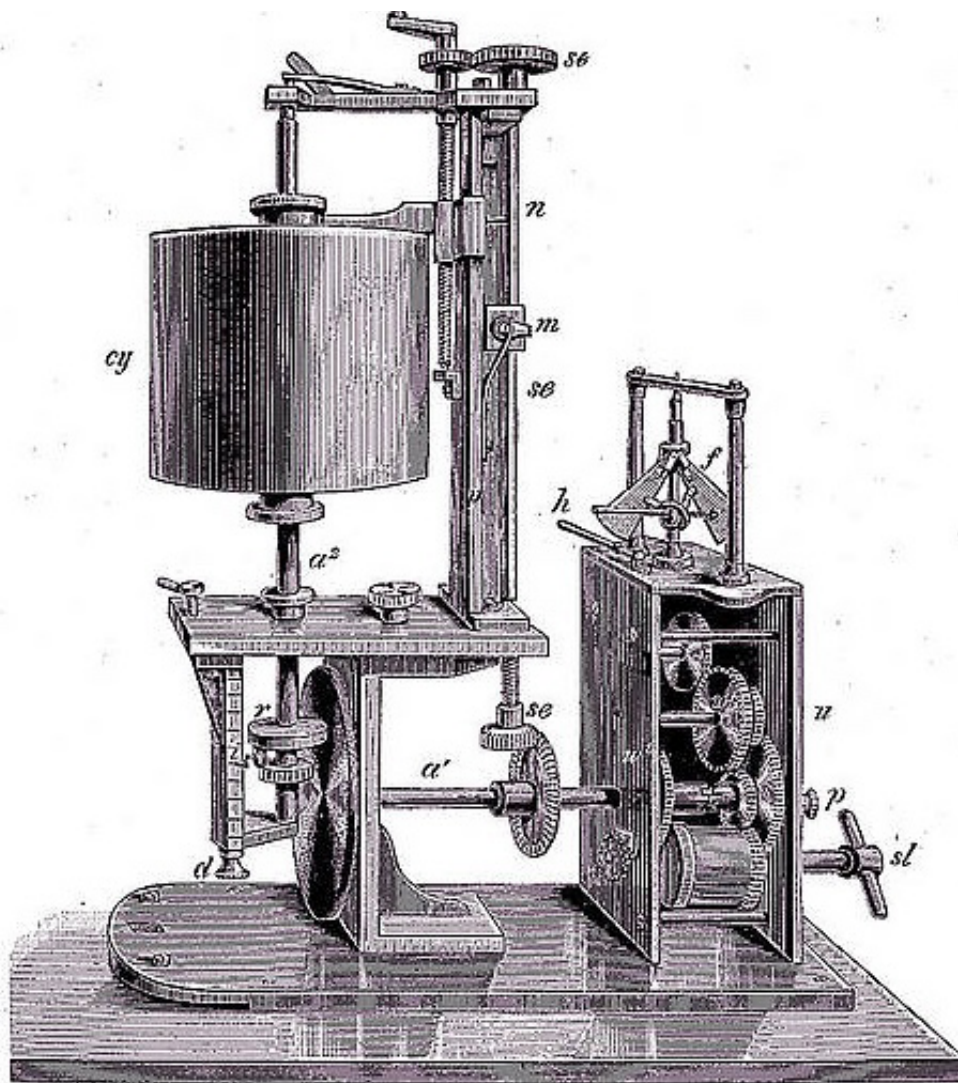
Carl Ludwig (1816-1895)

When physiologist Carl Friedrich Wilhelm Ludwig (1816-1895) first invented the Kymographion in the autumn of 1846, it was not to make psychological history, but to finally address an experimental necessity of vital importance.

Ludwig was the first to look for a way to register changes within the arterial pressure and respiration simultaneously, so he could draw conclusions about the correlation between external respiration and the circulatory system.

Not only did the Kymographion change the everyday work of many physiologists, but also did other sciences benefit from Ludwig’s work, honouring/crediting him for the invention of one of the most acclaimed apparatuses for quantitative measurement even beyond his death.

The Kymographion remained a much- and widely-used instrument among psychologists, till it was slowly substituted by modern technology during the seventies and eighties of the twentieth century.



Ludwig-Baltzarsches Kymographion

According to Frank (19,11 S.2), „... Kymographionen müssen in der Lage sein, Papier durch den Federpunkt mit einer gleichmäßigen Geschwindigkeit zu bewegen.“ Sounding rather simple at first, this theory proved to be quite a complex task considering the precision-engineered apparatus technology at that time. Firstly, the drive of the cylindrical register area used in this task had to be on time precisely, but still adjustable when needed. In order to reach that, different driving forces, such as dropping weights, electromagnetic forces or tensioned springs in clockworks, though the latter one remained the one used most widely.

Secondly, the process of evenly sooting the chart paper turned out to be more difficult than expected and moreover had the the scribe to simultaneously register the change, which was to be measured, on the chart.

Taking all this into account, it is not a surprise that the Kymographion was under steadily under construction. The Kymographion from 1906, as shown in the 3D-animation, belonged to the company Zimmermann settled in Leipzig, was capable of solving most of the challenges listed above.

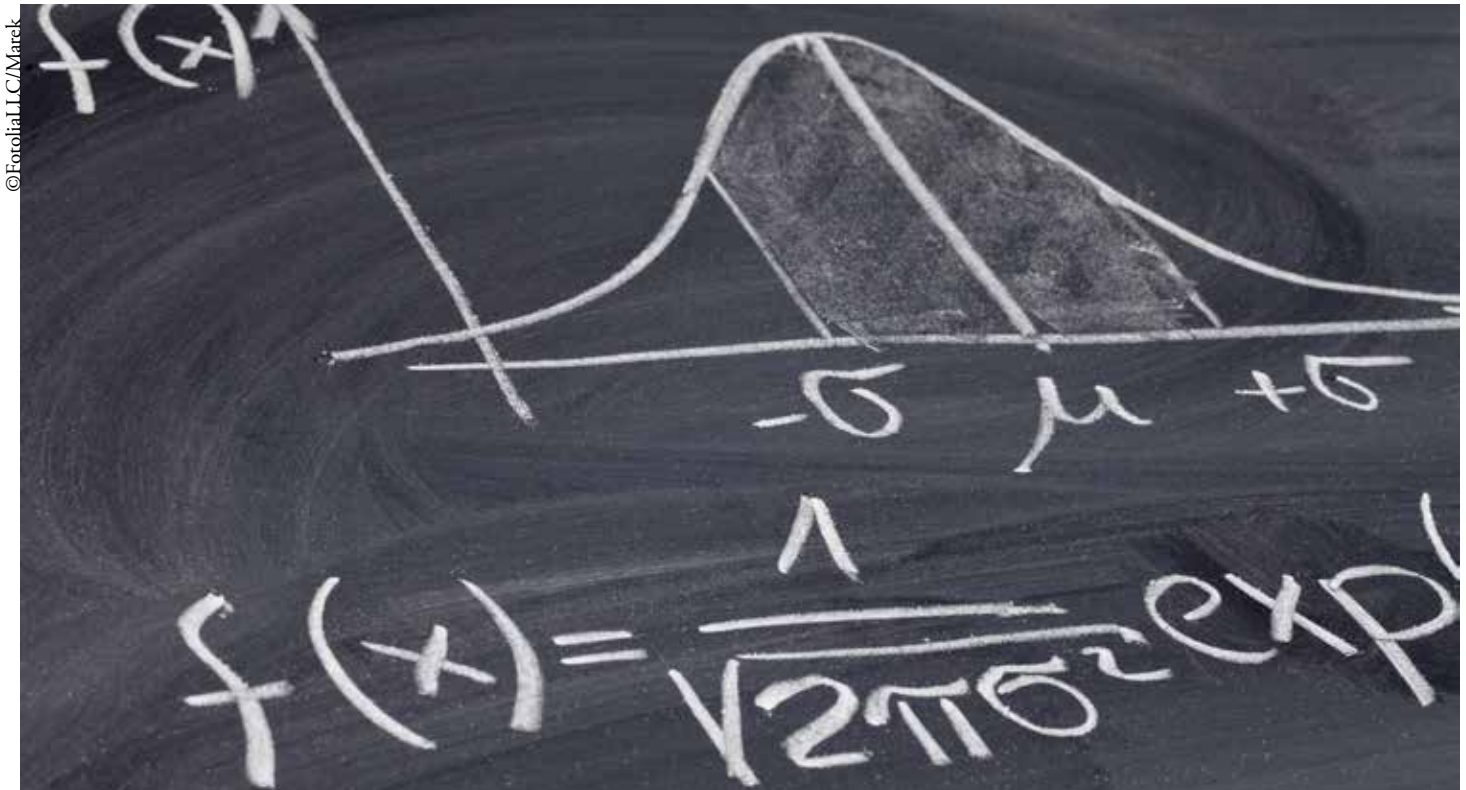
It was able to adjust to different rotation speeds and use the plotter drum horizontally as well as vertically, either with a right- or left-handed turn.

Armin Stock

Literatur:

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Five Minute Science Lesson: Validity and Reliability



Raymond Nelson

Validity, in scientific testing, refers to the degree to which a test measures what it is intended to measure. According to the Standards for Educational and Psychological Testing, published jointly by the American Educational Research Association, American Psychological Association, and the National Council on Measurement in Education (2014), validity is the degree to which evidence and theory support the interpretations that can be made of test scores. In more general philosophical terms, validity is partially an epistemological concern, centering around what it means to assert that we know something. In logic, validity is narrowly defined in terms of whether a conclusion or inference correctly follows the premises or arguments. Applied to the polygraph context, validity refers to the degree to which polygraph test results correspond with deception and truth-telling. In practical terms, polygraph validity refers to the degree to which test result can be expected to be correct or to concur with reality. Discussions of polygraph validity therefore typically refer to *criterion validity*, or to what degree the test results correspond probabilistically to the external criterion of interest – deception or truth-telling. In simplistic terms, validity tends to refer to test *accuracy*. However, scientific minded professionals will more commonly use the term *effect size*, which refers to the effect that test results provide in terms of increased accuracy compared to what



can be achieved simply by random guessing. Test validity and accuracy can also be thought of as *precision*, which involves both the closeness of the data to the target objective and the amount of error produced by the testing process. Improvements in the accuracy or precision of a process is often a matter of reducing the amount of error produced by the process.

Reliability refers to the consistency of test results when the testing procedure is repeated on a population of individuals or groups. Reliability can be discussed in terms of repeated testing, referred to as *test-retest reliability* or *simply retest reliability*, and also in terms of repeated analysis of data from a single test, referred to as *inter-rater reliability* or *inter-scorer reliability*. In the polygraph context, reliability can refer to the degree to which re-testing an examinee will produce the same test result, and also to the likelihood that two examiners will achieve the same analytic result when evaluating data from a single exam. Tests can be said to have high reliability if the repetition of a test or repeated analysis of data from a test will lead to a similar result or conclusion. One advantage that scientists and field practitioners have today, compared to decades past, is the availability of automated computer algorithms that provide feature extraction and data analysis with virtually essentially perfect reproducibility and reliability.

Reliability is not synonymous with validity. Instead, reliability can be said to determine the upper limit of validity. Said differently, a test cannot be valid if it not first reliable. This means that the reproducibility of a test result and conclusion is not itself sufficient to assert the correctness of the result and conclusion. It is possible that incorrect conclusions can be replicated through repeat testing or repeated analysis if there is some systematic cause for the testing error.

Metaphors can be useful to illustrate abstract concepts, and weapons metaphors are sometimes useful to illustrate scientific concepts. The target in Figure 1 shows an example of a test with nine stimulus events, referred to in scientific contexts as stimulus *trials*. If each trial were regarded as a separate test, the test can be said to be unreliable or to have weak reliability. It would be difficult to make any reasonable inferences about the meaning of the data in Figure 1 other than the general fact that there is a lot of variance in the test data.



Figure 1. Low reliability.

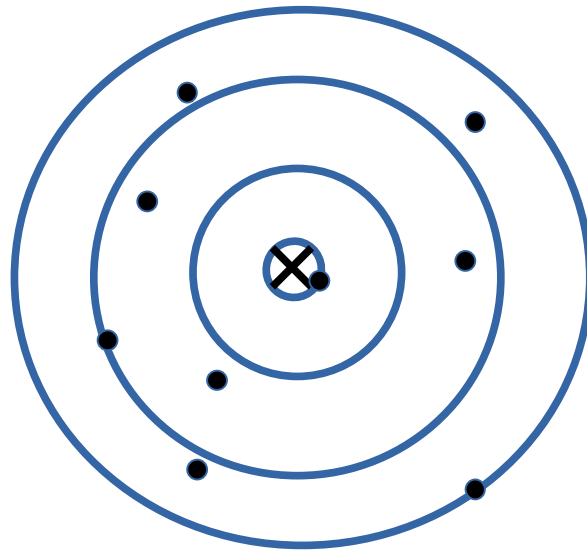


Figure 2 shows a metaphorical test with high reliability, and low validity. Although the variance among the nine stimulus trials is low in this example, resulting in a small data group, the average or center of the group is not close to the center target objective. The distance between the target or objective and the data can be thought of as the amount of testing error. This distance can also be thought of as *explained variance* because we can begin to assume that it is systematically related to the stimulus. Variance with the response group can be thought of as *un-explained variance*. Although validity is low for the data in Figure 2, the fact that reliability is high will mean that the process, involving both technology and skill, the testing process might be successfully adjusted to reduce the testing error associated with explained variance and thus increase the validity or precision or closeness of the data to the center-target objective.



Figure 2. High reliability, low validity.

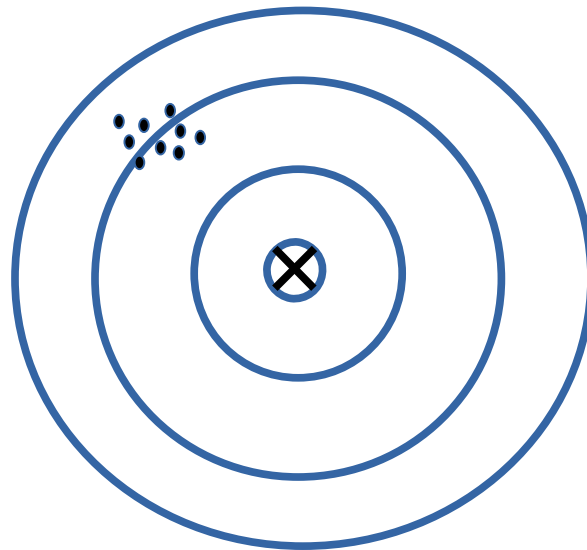


Figure 3 shows a metaphorical test with high reliability and high validity. In this example the data group small, but unlike Figure 2 the data group in Figure 3 is close to the center target objective.

Figure 3. High reliability, high validity.

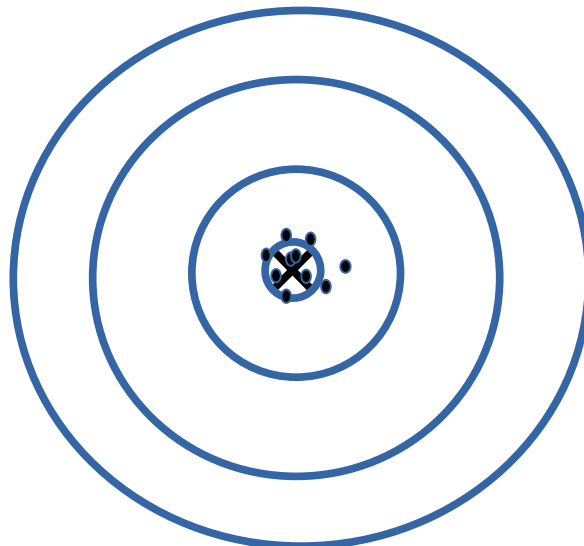
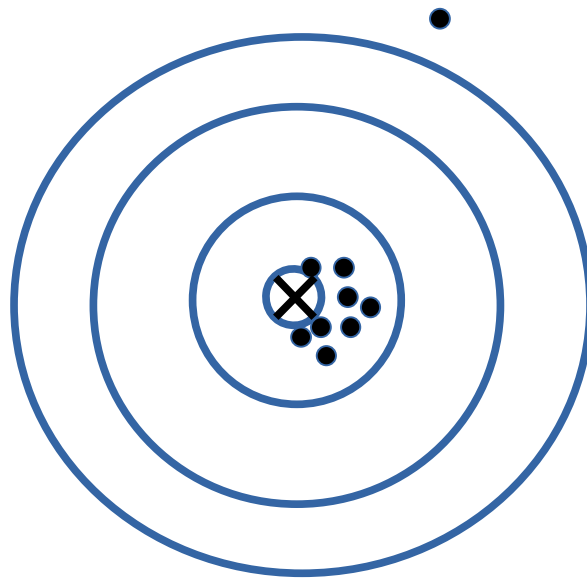


Figure 4 shows a metaphorical example of an outlier. The outlier data point is way outside the group of other data points and outside expected range of in test variance.



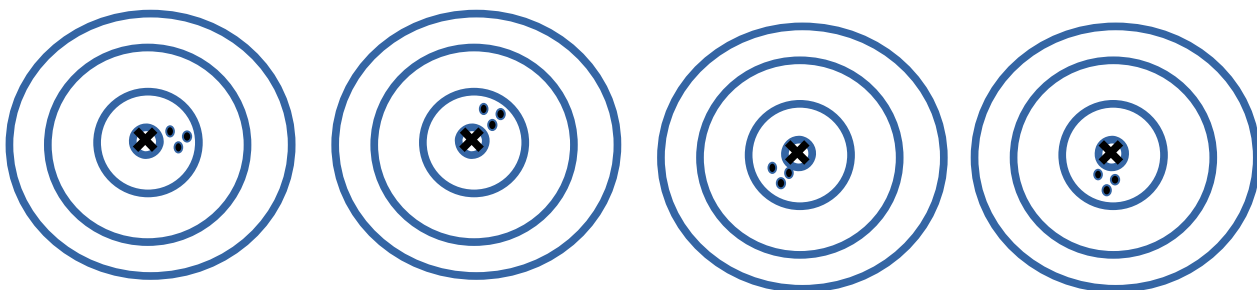
Figure 4. Outlier data point.



Outlier data points, when they are obvious and when there is an obvious group and pattern to the other data, can sometimes be ignored or excluded from analysis. While tempting, it will be impossible to explain the exact reason for the outlier data point unless the outlier is itself reproducible.

Figure 5 shows a metaphorical example of a multiple issue screening test, for which the test consists of multiple objectives with three stimulus and response trials for each target. Multiple issue exams are mathematically and statistically less precise than single issue exams, though there may be advantages to multiple issue exams in terms of increased screening sensitivity.

Figure 5. Multiple issue exam.



With fewer stimulus and result trials for each test target or objective there will be less data for each, resulting in larger errors of measurement and less precision compared to a test with more stimulus and response trials for individual targets. If test overall test accuracy is a function of both the accuracy and error, then any error on any target will have a greater potential to reduce test accuracy for the entire array of test targets. Using the weapon metaphor: if we have more targets and fewer bullets for each, then every bullet begins to matter more. In scientific testing, more stimulus and response trials will produce more data and smaller errors of measurement and greater precision. Said differently, more data will mean that there is more opportunity for the data to converge to the target objective – if the testing process is a valid process – despite the fact that there will always be some variability in the data. Each of the objectives in a multiple issue exam will introduce additional imperfection in both reliability and validity. This is a phenomena known as multiplicity, well known to statisticians and researchers, that can be somewhat reduced through the use of mathematical or statistical corrections such as those used in polygraph scoring algorithms (Nelson, 2015) and other data analytic methods. Overall accuracy for multiple issue exams will be a function of the total testing error which will be cumulative for all stimulus events and all targets.

Development and validation of tests and technology is often a matter of studying sources and types of variance and error that can be observed in a stimulus and response system. The exact cause of the variance will most likely remain unknown but will, in general, be related to variability in the stimulus event and variability in the response system. Of course, responses in these target metaphors in these examples are a straightforward mechanical matter and do not illustrate variability in the response systems for physiological data such as that recorded during polygraph testing. A good test will be one for which both the data are reliable, the analysis is reproducible, and for which validity can be established though the correlation of the combined test data, test result and conclusion with the target issue or criterion of interest.



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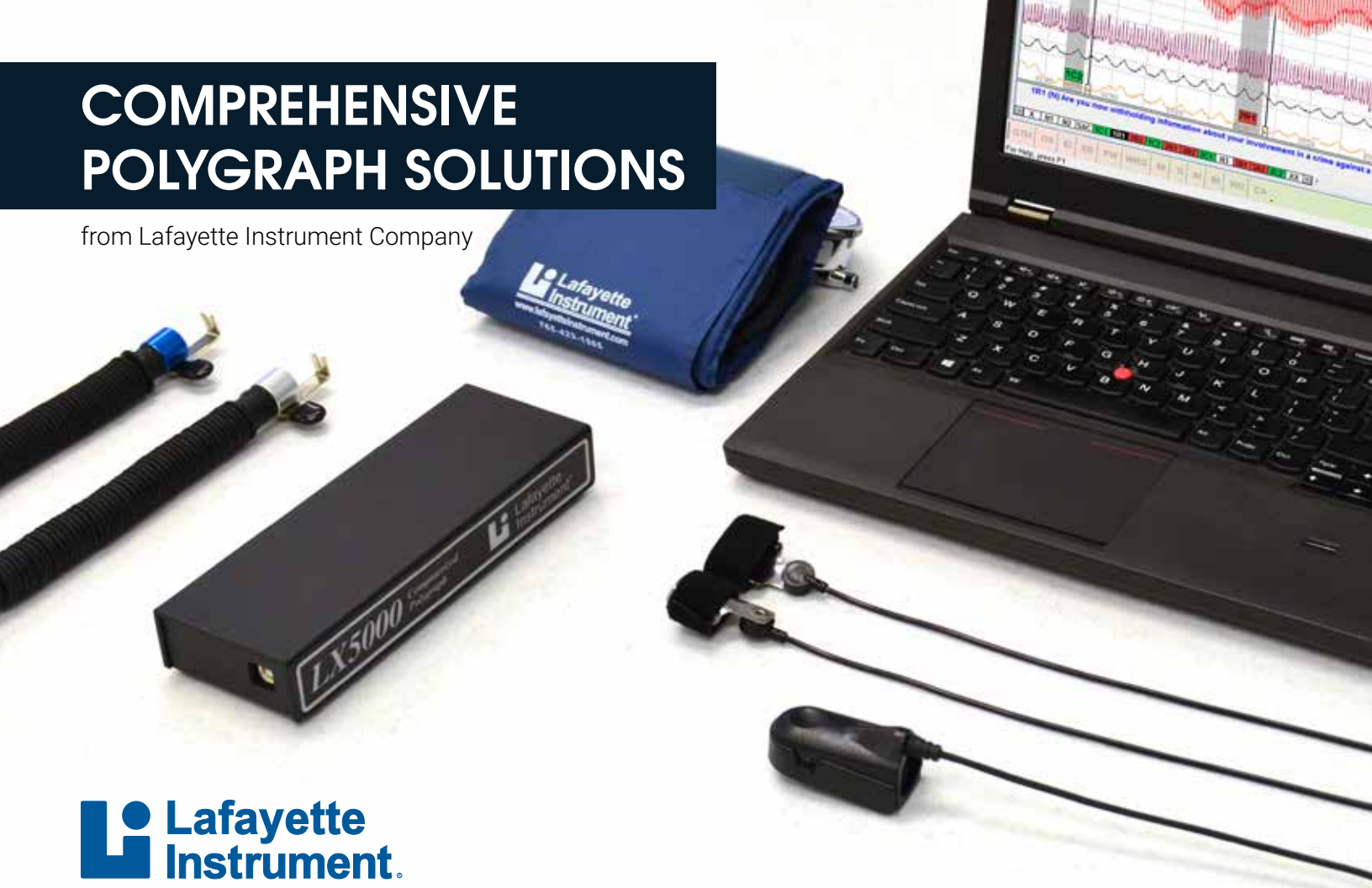
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Reprint: The Traces of Emotion



Introduction by Donald Krapohl¹

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In 1908 the Harvard psychology professor Hugo Münsterberg published his classic text *On the Witness Stand: Essays on Psychology and Crime*. Here Münsterberg's suggested that the field of experimental psychology could perhaps make some tentative steps out of the university laboratory and into the real world, as he said "to its possible service to the practical needs of life." In particular, Münsterberg proposed that his field could provide insights into the mind of the witness and the

suspect. Over several chapters Münsterberg identified sources of error in human recall, the dangers of aggressive questioning techniques, the unconscious effect of mood on muscle activity, uncontrolled eye movements that revealed thoughts, and of special interest to members of our profession, he suggested instrumentation and a testing method that anticipated the polygraph more than a dozen years before the lie detection experiments at the Berkeley Police Department.

¹ Past APA President, past APA Editor, former Deputy Director of the National Center for Credibility Assessment, and currently with the firm Capital Center for Credibility Assessment (C³A). He can be reached at donkrapohl@c3a corp.com.



The writings of John Larson during his time in polygraphy clearly show the influence of Münsterberg.

Münsterberg's book has been out of print for decades, and many examiners may not be familiar with it. It is a wonder to read through the lens of our current understandings. Insightful as he was, though, Münsterberg was not necessarily ahead of his time. Instead, he was the best representative of his times. His writings showed a clear-headed thinking, informed by science of the era and shaped by the failings of institutions to be aligned with that science. He brought to the world a new and powerful idea, that the infant field of applied psychology could be more than an academic exercise, but could actually help solve societal problems. It was that explanatory bridge between science and everyday life that made his idea so compelling.

To help understand the scientific thinking leading up to Larson and Keeler regarding lie detection, the *APA Magazine* has reprinted here an important portion of Münsterberg's book, important at least from the perspective of those of us whose profession it is to infer truth and deception from physiological responding. It is his chapter titled *The Traces of Emotion* (pp 113-132), and in it he proposes perhaps for the first time the use of physiological

data to detect deception for the purposes of criminal investigation¹. For authenticity, Dr. Münsterberg's original spellings have been retained.

The Traces of Emotions

If a girl blushes when a boy's name is mentioned in the family sitting-room, we feel sure, even if she protests, that he is not quite indifferent to her young heart. If she opens a letter and grows pale while reading it, she may assure us that the event is unimportant; we know better. If she talks with you and every word makes you believe that her entire interest belongs to you and your remarks, it is enough for you to see that her fingers are playing nervously with her fan, and that her breathing has become deep and vehement and her eyes restless since a certain guest has entered the room; you know she is hardly listening to you and waits only for him to approach her. And if he does not come, — she may be masterful in simulation and the artificial smile may never leave the lips, yet you will hear her disappointment in the timbre of her voice, you may see it even in the width of the pupil of her eye.

Yes, the hidden feeling betrays itself

¹ Those who would like a free and complete electronic copy of *On the Witness Stand* can access it at <https://archive.org/details/onwitnessstandes00mnst>



often against the will of the best comedian in life. It may be easy to suppress intentionally the conspicuous movements by which we usually accentuate the emotions. It is not necessary to become wild with anger and to collapse in sorrow, we may even inhibit laughter and tears, and a New Englander will never behave like a Southern Italian. But the lips and hands and arms and legs, which are under our control, are never the only witnesses to the drama which goes on inside — if they keep silent, others will speak. The poets know it well. Through the dramatic literature of all ages is repeated the motive of the unintentional expression of emotions. The ghastly memory of a gruesome past seems locked up in the hero's mind; and yet when he is brought back to the place of his deed, it comes to light in his paleness and trembling, in the empty glaring of his eyes and the breaking of his voice. There is hardly a tragedy of Shakespeare in which the involuntary signs of secret excitement do not play their role. And the comedies of all time vary the same motive with regard to the lighter sins of love and social entanglement. The helpless stammering of the excited lover betrays everything which his deliberate words are to deny.

But the signs which made Hamlet sure that his mother had committed murder have not been overlooked by

those who are on the track of the criminal in our practical life. The suspected man who pales before the victim while he pretends not to know him, or who weeps at hearing the story of the crimes which he disavows, is half condemned in the eyes of the prosecutor. When the conspiracy against Dreyfus sought to manufacture evidence against him, they made much of the fact that he trembled and was thus hardly able to write when they dictated to him a letter in which phrases of the discovered treasonable manuscript occurred. Much of that which the police and the delinquents call the third degree consists of these bodily signs of a guilty conscience; to make the accused break down from his own inner emotion is the triumph of such maladministration of law.

It seems that even some of the superstitions of barbaric times which claimed to discover the guilty by all kinds of miracles sometimes contained a certain truth of this kind. They depended on apparently mysterious signs which in reality sometimes belonged to the bodily effects of emotion. Evidently primitive life sharpens the observation of such symptoms. One of the most adventurous "gunmen" of the West told me that when he was attacked by mobs he behaved as if he were constantly spitting; he went through such motions because



it always discourages the crowd when they see that their adversary does not fear them, and they would know that a man who is afraid cannot spit — the emotion of fear dries up the mouth and throat.

Of course, everyone knows how uncertain and unsafe such crude police methods must be. There cannot be justice if we base our judgment on the detective's claim that a man blushed or trembled or was breathing heavily. It would hardly be better than those superstitious decisions of early times. There are too many who believe that they see what they expect to see, and very different emotions may express themselves with very similar symptoms. The door is open for every arbitrariness if such superficial observations were to count seriously for acquittal or for conviction.

But that provokes the natural question: cannot science help us out? Cannot science determine with exactitude and safety that which is vague in the mere chance judgment of police officers? More than that: cannot science make visible that which is too faint and weak to be noticed by the ordinary observer? The bystander watches the expressions of the strong overwhelming emotions — but can science, can experimental psychology, not bring to light the traces of the whole interplay

of feelings, the light and passing ones as well as the strong, and the most hidden suggestions of consciousness as well as heavy emotional storms?

The question is indeed pressing, as the idea of the psychological expert in court cannot be withdrawn from public discussion. The mental life, — perception and memory, attention and thought, feeling and will — plays too important a role in court procedure to reject the advice of those who devote their work to the study of these functions. And especially the progress of modern psychology has been too rapid in recent years to ignore it still with that condescension which was in order at the time when psychologists indulged in speculation and psychological laboratories were unknown. To-day the psychologist operates with the methods of exact science, and the method which is here demanded seems entirely in harmony with his endeavors. The problem is whether he can record objectively the passing symptoms and whether he can get hold of expressions too faint to be perceptible to our senses. But just that the laboratory psychologist is aiming at constantly and successfully. Whether he measures the time of mental acts or analyses the complex ideas, whether he studies the senses or the volitions, he is always engaged in connecting the vague inner impression



with an outer measurable fact which can be recorded, and in throwing full light on that which escapes notice in ordinary life.

In the region of feelings and emotions the experimental methods of psychology have been certainly not less successful than in other fields of inner life. To confine ourselves to that special problem which interested us from the point of view of law: the psychologist can indeed register the symptoms of inner excitement and, more than that, can show the effects of feelings and emotions of which the mere practical observation does not give us any trace. Yet even the subtlest detective work of the psychological instruments refers only to the same bodily functions which make us visibly blush in shame, pale and tremble in fear, shiver in horror, weep in grief, perspire in anxiety, dance in joy, grow hot and clench the fist in anger. Everywhere the blood vessels contract or dilate, the heart beat changes, the glands increase or decrease their activity, the muscles work irregularly: but the instruments allow us to become aware of almost microscopic changes. We may, perhaps, point to a variety of lines along which such inquiry may move.

To begin with a very simple group of processes, we may start with our ordinary movements of the arm: does

feeling influence them? I can give my reply from a little diary of mine. I kept it years ago. It was not the regulation diary — there was no sentimentality in it, but mostly figures. Its purpose was to record the results of about twenty experiments which took about half an hour's time. I had the material for these little experiments always in my pocket and repeated them three or four times a day throughout several months. I fell to experimenting whenever daily life brought me into a characteristic mental state, such as emotion or interest or fatigue or anything important to the psychologist. One of these twenty experiments was the following: I attached to the bottom of my waistcoat a small instrument which allowed me to slide along an edge between thumb and forefinger of the right hand, both outwards and inwards. Now I had trained myself to measure off in this way from memory distances of four and eight inches. Under normal conditions my hand passed through these distances with exactitude while the eyes were closed; the apparatus registered carefully whether I made the distance too long or too short. The results of many hundreds of these measurements went into my diary together with a description of the mood in which I was.

When I came to figure up the results after half a year's records I found a



definite relation between my feelings and my arm movements. My diary indicated essentially three fundamental pairs of feeling in the course of time. There was pleasure and displeasure, there was excitement and depression, and there was gravity and hilarity. The figures showed that in the state of excitement both the outward and inward movements became too long, and in the state of depression both became too short; in the state of pleasure the outward movements became too long, the inward movements too short; in the state of displeasure the opposite — the outward movements too short and the inward movements too long. In the case of gravity or hilarity no constant change in the length of the movement resulted, but the rhythm and rapidity of the action was influenced by them.

Here were, for the first time, three distinct sets of feelings separated and recognized through three distinct ways of bodily behavior. After the publication of my figures, others came from other starting points to such division of our feelings into three groups, while some believe that there are only two sets. Still others hold, and I should not disagree, that pleasure and displeasure alone are the fundamental feelings; that a color or a sound is agreeable seems primary, that it is exciting or soothing is secondary. On the other

hand the number of those secondary feelings seems to me to-day still larger than it did at that time; I am inclined to accept many more simple feelings and find for everyone characteristic expressions of movement. All this becomes important as soon as the psychologist begins to explain the feelings and asks how far the sensations themselves enter as parts into the feelings.

But what concerns us here is the fact that the pleasurable and the unpleasurable mood betray themselves in opposite movement — impulses of which we are unaware. I had meant in those hundreds of cases to make exactly the same outward and inward movements and yet the experiments disclosed the illusion. Of course, we all know how in joy the outward movements are reinforced; the boy swings his cap and the whole body stretches itself, while in anger the opposite impulses prevail — the contraction of the fist becomes typical. The experiments show that these various impulses are at work when we do not know and do not show it: we must bring the man before a registering apparatus to find out from his motions without his knowledge whether sunshine or general cloudiness prevails in his mind.

But the unintentional movements may become symptoms of feelings in still a



different way. The thing which awakes our feeling starts our actions towards the interesting object. All muscle reading or thought reading works by means of such a principle. The ouija-board of the spiritualists is a familiar instrument for the indication of such impulses, and if we want a careful registering of the unnoticeable movement, we may use an automatograph — a plate which lies on metal balls and thus follows every impulse of the hand which lies flat on it; the plate has an attachment by which the slightest movements are registered on a slowly moving surface. If the arm is held in a loop which hangs from the ceiling, the hand will still more easily follow the weakest impulse without our knowledge. Ask your subject to think attentively of a special letter in the alphabet and then spread twenty-five cards with the letters in a half-circle about him; his arm on the automatograph will quickly show the faint impulse towards the letter of which he thought, although he remains entirely unaware of it. And if a witness or a criminal in front of a row of a dozen men claims that he does not know any one of them, he will point on the automatograph, nevertheless, towards the man whom he really knows and whose face brings him thus into emotional excitement. Still easier may be the graphic record, if it is not necessary to show a definite direction but simply a sudden

reaction. The hand may lie on a rubber bulb or on a capsule covered with very elastic rubber and the slightest movement of the fingers will press the air in the capsule which, through a rubber tube, is conducted to a little bulb that pushes a lever and the lever registers its up and down motions. The accused may believe himself to be motionless, and yet when he hears the dangerous name of the place of his crime or of an accomplice, his unintentional muscle contraction will be registered. It is only a question of technique thus to take exact record of the faintest trembling when a little cap is attached to the finger.

The emotional interest may betray itself in an interesting way even through movements which are ordinarily not consciously guided like those of our hands and fingers; I am thinking of the eye movements. I found that our eyes may go their own way without our knowledge. My subject, for instance, looks straight forward; I show him a card with a printed word which is indifferent to him. We have agreed beforehand that after seeing and reading the card he is to close his eyes, to turn his head somewhat sideways, and then to open his eyes again. The experiment shows that if he does perform these acts, his eyes, after the sideward movement of his head, look in the same direction in which his head



points. I repeat this several times; always with the same result. Now I take a card with a word which, I know, is emotionally important to my subject from an earlier experience. The result is suddenly changed: he reads it, closes his eyes, turns his head, opens his eyes again, and, without his knowledge, his eyes have not followed his head but are still turned towards the exciting word — the feeling interest has been betrayed by the unintentional backward rotation of the eyeballs. I may show in this way to the suspected man one indifferent thing after another; his eyes will follow his head. Then I show an object which was instrumental in the crime or which was present at the place of the deed or which belonged to the victim and, if he recognizes it, his eyes will stick to it while his head is moving and after. Yes, the police know from old experience that not only do the eyes want to be back at the exciting scene, but the whole man is magnetically drawn to the spot where the crime was committed. Dostojewski shows us how the murderer, almost against his own will, returns to the place of his emotion and thus runs upon his doom.

We are still speaking, of course, of movements and yet of an entirely different process if we consider the breathing. Our inspirations and expirations can be registered in finest de-

tail and a variety of elegant methods are available. Perhaps the simplest “pneumograph” consists of a tube made of spiral wire and covered with rubber, to be attached by ribbons to the chest. Every respiratory movement lengthens and shortens the tube, and this presses a part of the air contained into a little capsule, the cover of which follows the changing pressure of the air and moves a registering lever, usually a large straw which enlarges the movements of the cover. The end of the straw but touches the smoked surface of a slowly revolving drum; it thus writes in the thin layer of smoke a wave line which shows the subtlest features of the breathing. It is a simple task to measure every element of such a curve, every change in the length, in the height, in the angle, in the regularity of the wave; and that means every change in the rapidity, rhythm, distribution, pauses and strength of the breathing. As soon as such delicate methods of registration are applied, the intimate relation between feeling and breath becomes evident. Pleasure, for instance, makes the respiration weaker and quicker; displeasure, stronger and slower; excitement makes it stronger and quicker; acquiescence, weaker and slower. But such generalizations cannot do any justice to the manifoldness of changes that may occur: every ripple on the interests of the mind reflects itself in the



changes of the pneumographic wave — it may be an agreeable or disagreeable smell or taste, it may be exciting or depressing news from without or a fancy from within.

The same holds true for the heartbeat, measured by the blood wave in the arteries; such a pulse writer is called a sphygmograph. It may be attached, for instance, to the wrist; a delicate lever presses against the wall of the blood vessel just where the finger of the physician would feel the pulse. The lever is attached again to the thin rubber which covers an air chamber, and the changing pressure of air is again transmitted to a long straw which writes an enlarged record of the movement on the revolving drum, rotating regularly by means of clockwork. Here again the height and length and form of every pulse beat may have its own physiognomy. When we write pulse and breathing together on the same drum, we see at once that even every ordinary inspiration changes the pulse; while we inhale we have a pulse different from the pulse while we exhale. Far more influential are the feelings. Again it is only an insufficient abstraction if we generalize and say: pleasure heightens and retards the pulse, displeasure weakens and accelerates it, or excitement makes the pulse stronger and quicker, acquiescence weaker and slower. But there

is still another way open to observe the changes in our blood vessels. We may examine the quantity of blood, for instance, which streams to a limb, by means of the so-called plethysmograph. The arm is held by a large tube filled with water; a rubber ring closes the tube. The change of blood supply which makes the arm swell changes the pressure which the water exerts against the air, which is again conducted through a rubber tube to a recording lever; every emotional excitement speaks in the blood supply of every limb. All these instruments of registration have belonged for decades to the household equipment of every physiological laboratory; it was therefore a sad spectacle when recently scores of American papers told their readers that I had invented the sphygmograph and automatograph and plethysmograph this summer — they might just as well have added that I invented the telegraph last spring. To recent years belongs only the application of these instruments for the study of feelings and emotions.

But we may go still further and point to expressions of emotions which are entirely beyond human senses. If we put our hands on two copper plates and make the weak galvanic current of a battery run through the plates and our body, we can, with the help of a delicate galvanometer, measure the





slightest variations of the resistance to the current. Experiment shows that such changes occur, indeed, if our brain is excited; any emotional disturbance influences the resistance: it seems that the activity of the sweat-glands in the skin is under the nervous influence of our feelings, and the functioning of these glands alters the electrical conditions. A word we hear may excite us and at once the needle of the galvanometer becomes restless: there is no more uncanny betrayal of our inmost mind. Or we may point to the curious facts of the knee jerk. A little hammer falls always from the same height on the tendon of the knee, and every time the leg makes a jerking reflex movement, the angle of

which can be registered. Experiment shows again that this angle changes with the emotional excitement of the mind; evidently the brain sends impulses down to the lower part of the spinal cord where the knee reflex is produced, and the emotion inhibits those messages and changes the whole function. Even the temperature of the body seems to be influenced by excitement; the experienced physician knows how the emotion of the patient can change his feverish state, and experiment seems to indicate similar changes for the normal state. There is thus really no doubt that experimental psychology can furnish amply everything which the court demands: it can register objectively the



symptoms of the emotions and make the observation thus independent of chance judgment, and, moreover, it can trace emotions through involuntary movements, breathing, pulse, and so on, where ordinary observation fails entirely. And yet, it seems to me that a great reluctance and even a certain skepticism as to the practical application of these methods is still in order. Firstly, the studies in this field of the bodily registration of emotion are still in their beginnings and so far many difficulties are not overcome; there are still contradictions in the results of various scholars. Especially we know too little yet about the evident individual differences to make, for instance, a breathing and pulse curve to-day a basis for a legal condemnation or acquittal. The facts themselves are so complicated that much further work must be done before we can disentangle the practical situations.

Secondly, experiment gives us so far not sufficient hold for the discrimination of the guilty conscience and the emotional excitement of the innocent. The innocent man, especially the nervous man, may grow as much excited on the witness stand as the criminal when the victim and the means of the crime are mentioned; his fear that he may be condemned unjustly may influence his muscles, glands and blood vessels as strongly as if he were guilty.

Experimental psychology cannot wish to imitate with its subtle methods the injustice of barbarous police methods. The real use of the experimental emotion-method is therefore so far probably confined to those cases in which it is to be found out whether a suspected person knows anything about a certain place or man or thing. Thus if a new name, for instance, is brought in, the method is reliable; the innocent, who never heard the name before, will not be more excited if he hears that one among a dozen others; the criminal, who knows the name as that of a witness of the crime, will show the emotional symptoms. And yet, it may be rash to propose narrow limits for the practical use, as the rapid progress of experimental crimino-psychology may solve to-morrow those difficulties which seem still to stand in the way to-day.

End of chapter.



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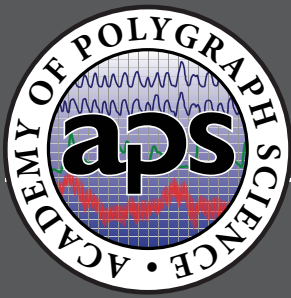
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