The Police Polygraph Digest

JANUARY 2016

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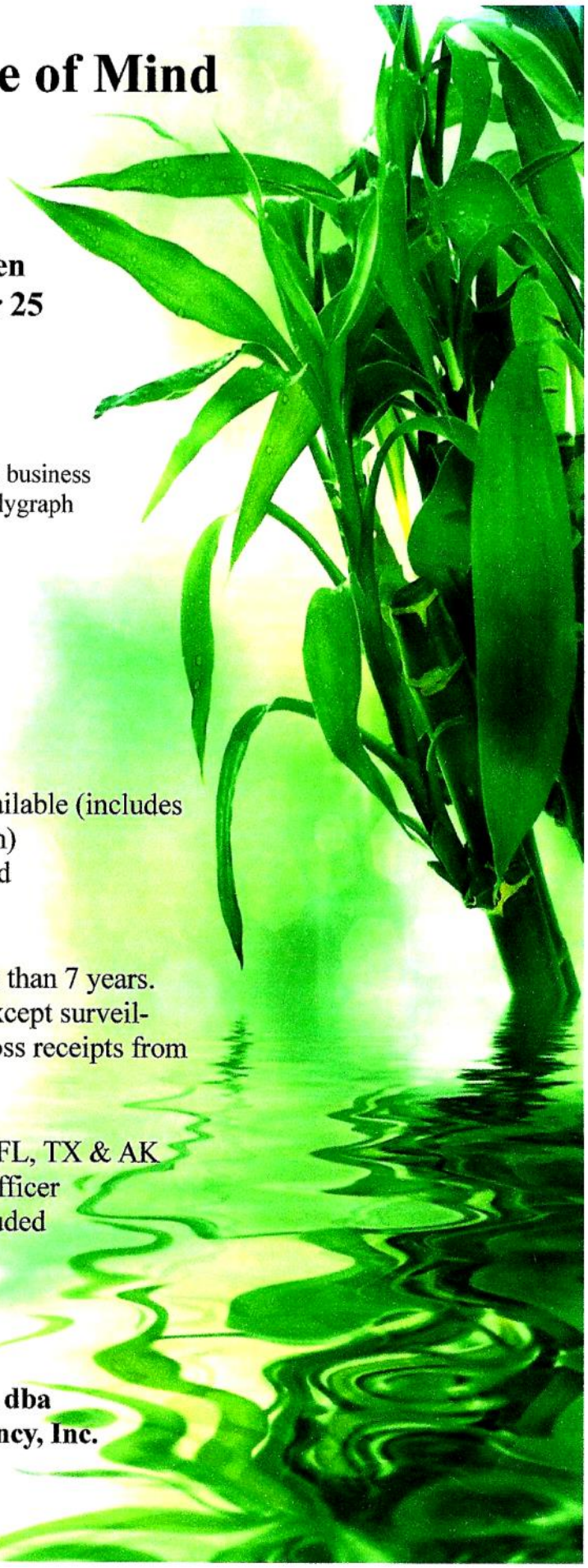
Deadline for the March 2015 issue is February 1, 2016

Insurance is about Peace of Mind



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AAPP 2016 SEMINAR

Mohegan Sun

Host: Connecticut Polygraph Association

SCHEDULE

Revised 12/18/2015

SUNDAY, June 12, 2016

TIME	*TOPIC*	*ROOM*
	Golf Outing	***Mohegan Sun Country Club "Bill Wesche"***
1:00p – 5:00p	**Registration**	**Ballroom Pre-function ABC**
5:15p – 5:45p	**Worship Service Barry Cushman AAPP Chaplain**	**Abenaki Lobby Level Meeting Area**
6:00p – 8:00p	**President's Reception**	**Vista Lounge**

MONDAY, June 13, 2016

TIME	*TOPIC*	*INSTRUCTOR*	*ROOM*
6:15a – 7:45a	Registration	*AAPP BOD*	Ballroom Pre-function ABC
8:00a – 9:00a	Opening Ceremony	Welcome and Special Announcements	Uncas Ballroom B&C
9:00a - 10:00a	*Guest/Spouse Breakfast (Registered guests only)*	*President – James Wardwell Region Director – Adam Rembisz*	*TBD*
9:00a –12:00p	"Catch a Liar" Psychological Narrative Analysis	Jack Schafer Ph.D. Retired FBI http://www.drjackschafer.com/	Uncas Ballroom B&C
10:00a – 12:00p	* QC- One on One	Elmer Criswell Confidential Review of Charts	TBD
12:00p –1:00p	*Lunch- on your own*		
12:00p –1:00p	Past President Lunch	President - James Wardwell	TBD
12:00p – 5:00p	* QC- One on One	Elmer Criswell Confidential Review of Charts	TBD
1:00p - 5:00p	"Catch a Liar" Psychological Narrative Analysis	Jack Schafer Ph.D. Retired FBI http://www.drjackschafer.com/	Uncas Ballroom B&C
5:00p – 6:00p	Meet Your Regional Director	Regional Directors I - V	TBD

TUESDAY, June 14, 2016

TIME	*TOPIC*	*INSTRUCTOR*	*ROOM*
8:00a-12:00p	Stoelting Company	Guillermo Witte, M.S.	Salon D2
8:00a – 12:00p	Effective Law Enforce-ment Screening Using DLST	Walt Goodson	Salon D3
8:00a - 12:00p	Inside the Criminal Mind	Stanton Samenow, Ph.D. http://www.samenow.com/bio.html	Uncas Ballroom B&C
12:00p – 1:00p	*Lunch- on your own*		

(Tuesday schedule continued on next page)

*** NOTE: If "QC- One on One times do not coincide with your needs, please see Elmer Criswell directly to schedule an alternate time.**

TUESDAY, June 14, 2016

(Continued)

TIME	*TOPIC*	*INSTRUCTOR*	*ROOM*
12:00p – 1:30p	***State & National Leadership Luncheon*** *(Invitation only)*	***Vice President Tracey Hilton And AAPP BOD (1 Person from each association/ must preregister)***	
1:00p – 5:00p	**Validated Techniques**	**Ben Blalock**	**Salon D3**
1:00p – 5:00p	**Inside the Criminal Mind**	**Stanton Samenow, Ph.D.**	**Uncas Ballroom B&C**
1:00 – 5:00p	**Limestone**	**James Brown Donald Bethune**	**Salon D2**
5:15p – 7:15p	**Tuesday Night Function** **(Must wear name tags)**	***Registered Seminar Attendees and Registered Guests***	**Margaritaville**

WEDNESDAY, June 15, 2016

TIME	*TOPIC*	*INSTRUCTOR*	*ROOM*
8:00a-12:00p	**Axciton Systems**	**Bruce White**	**Salon D1**
8:00a-12:00p	**Annual Business Meeting**	**General Membership**	**Uncas Ballroom B&C**
12:00p – 1:00p	***Lunch- On your own***		
1:00p – 3:00p	**QC- One on One**	**Elmer Criswell Confidential Review of Charts**	**TBD**
1:00p - 5:00p	**Legal Issues in Law of Enforcement**	**Attorney Eric Daigle https://www.daiglelawgroup.com/**	**Salon D3**
1:00p – 5:00p	**PLE**	**Pam Shaw Mark Handler**	**Salon D2**
1:00p – 5:00p	**Lafayette**	**Chris Fausett**	**Salon D1**
3:00p – 5:00p	**School Director's Meeting** **(Sign up at Registration Desk)**	**Vice President Tracey Hilton and Secretary Bob Heard**	**TBD**

THURSDAY, June 16, 2016

TIME	*TOPIC*	*INSTRUCTOR*	*ROOM*
8:00a – 12:00p	QC- One on One	Elmer Criswell	TBD
8:00a-12:00p	Countermeasures	Walt Goodson	Salon D3
8:00a -12:00p	Physiology of Deception	Dr. David Bernstein http:// www.forensicconsultants.com/	Uncas Ballroom B&C
12:00p- 1:00p	*LUNCH – on your own*		
1:00p – 5:00p	QC- One on One	Elmer Criswell	TBD
1:00p – 5:00p	Case Study	Ron Barndollar	Salon D3
1:00p – 3:00p	Research on Breathing In-struction	Dale Austin	Salon D2
3:00p – 5:00p	CIT	Dale Austin	Salon D2
1:00 – 5:00p	Connecticut Polygraph Association Examiners	CPA President - Chris Chute	
5:30p – 6:00p	*Cocktail Hour*	*General Membership*	Ballroom Pre-function Area
6:00p – 8:00p	*Annual Banquet Awards* *(Must wear nametags and present*	*Registered Seminar Attendees and Registered Guests*	Uncas Ballroom

FRIDAY, June 17, 2016

TIME	*TOPIC*	*INSTRUCTOR*	*ROOM*
8:00a – 12:00p	Visual Stimuli in Polygraph	Ales Galunic & Goran Savic Republic of Slovenia	Salon D2
8:00a – 12:00p	PSCOT	Darrell Bullens	Salon D1
12:00p – 1:00p	*LUNCH – on your own*		
1:00p – 5:00p	QC- One on One	Elmer Criswell Confidential Review of Charts	TBD
1:00p – 5:00p	PSCOT	Darrell Bullens	Salon D1
1:00p – 5:00p	CQB	Erwin Ballarta	Salon D2

Closing Remarks Immediately following last speaker – AAPP President

** *Although seldom done, the AAPP reserves the right to change class times, topics and speakers without advanced notice*

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Screening Survival Analysis - Understanding Base Rates, Accuracies, & Successive Hurdles in Credibility Assessment Screening with Complementary Technologies

Mark Handler and Charles Honts

At the recent 50th Anniversary APA seminar in Chicago, we were introduced to a new commercial alternative credibility assessment technology (Raskin, 2015). The new technology, EyeDetect, was originally known as Ocular Motor Deception Testing. Within a reading exercise, it uses a number of physiological, reading behavior, and answering behavior metrics to categorize subjects along a truthful or deceptive continuum. EyeDetect was developed by a team of researchers at the University of Utah. It has been tested in a number of Latin American countries where the results are encouraging.

The idea of the technique is not to replace polygraph (PDD), but rather to improve the overall accuracy of the credibility assessment screening process by using both EyeDetect and PDD in a "successive hurdles" configuration. Successive Hurdles (Meehl & Rosen, 1955) is the sequential application of tests with the goal of maximizing information gained in the context of varying base rates and technology accuracies. Hopefully this short article will help the reader better understand how base rates of deception and test accuracies affect testing outcomes. We also introduce the concept of "screening survival analysis" posited by Charles Honts. We find it an intuitive way to understand the outcomes of a successive hurdles approach when applying multiple technologies. We also believe it opens a dialogue about considering the goals of testing in the screening process and developing strategies towards achieving those goals.

We will illustrate the interaction of test accuracy, base rates, confidence in test outcomes and information gained during the implementation of a successive hurdles testing configuration. One of our goals is to show how using one technology to adjust the base rate of deception can improve the outcome of the second stage of testing. Depending on your testing goals, you can choose how to follow-up first stage testing. Some examples will hopefully help.

Equal Base Rates and Equal Accuracies

First consider a hypothetical credibility assessment test (Stage 1) in Table 1.

Under the Ground Truth column, we list the actual state of the subject. For consistency sake with published scientific studies, we refer to these as Innocent and Guilty. We

realize in a criminal justice setting these are determined by triers of fact but here we use the terms to refer to status in the real world. TN is True Negatives or correct hits with Innocent cases. FN is False Negatives or misses with Guilty cases. TP is True Positives or correct hits with Guilty cases. FP is False Positives or misses with Innocent cases.

We apply that test to 1000 individuals, 500 of whom are Innocent and 500 of whom are Guilty, so the base rate of Guilt is 50% or .50. Assume the test is 90% accurate with both Innocent and Guilty subjects. For simplicity, we did not include the possibility of an inconclusive outcome.

Table 1. Contingency Table with equal accuracy (90%) and equal base rates (50%)

Ground Truth	Pass Test	Fail Test	Totals
Innocent	450 (TN)	50 (FP)	500
Guilty	50 (FN)	450 (TP)	500
Totals	500	500	1000
Outcome Confidence	**0.9 (NPV)**	**0.9 (PPV)**	

The numbers in the bottom row can be thought of as your confidence in the accuracy of the various outcomes. These proportions also have statistical names. The proportion of correct truthful outcomes to total truthful outcomes (here, 450/500) is known as the Negative Predictive Value (NPV). The proportion of correct deceptive outcomes to the total number of deceptive outcomes is known as the Positive Predictive Value (PPV), here, 450/500). Notably in this example with equal base rates your confidence in the test outcomes directly mirrors the accuracy of the test.

Equal Base Rates and Different Accuracies

Let's complicate this just a bit. Table 2 illustrates a second case with equal base rates, but where the test has an accuracy of 95% with Guilty, but is only 85% accurate with Innocent. The notable thing from Table 2 is that although the test is more accurate with Guilty, you have more confidence in Pass Test outcomes (NPV = .94) than you do in Fail Test outcomes (PPV = .86). That is because the number of Guilty and Innocent subjects who pass or fail the test changes disproportionally due to the imbalanced accuracies. This imbalance is reflected in the trade-off in Outcome Confidence.

Table 2. Contingency Table with equal base rates (50%) but different accuracies (Guilty = 95%, Innocent = 85%)			
Ground Truth	Pass Test	Fail Test	Totals
Innocent	425 (TN)	75 (FP)	500
Guilty	25 (FN)	475 (TP)	500
Totals	450	550	1000
Outcome Confidence	**0.94 (NPV)**	**0.86 (PPV)**	

Different Base Rates and Equal Accuracies

Finally, a third example that shows the impact of base rates on confidence in outcomes. Table 3 illustrates an example where the target of the screening test is a relatively rare event and occurs in only 10% of the people who are tested. For simplicity, Table 3 goes back to a test with equal accuracy of 90%. In this situation where the target occurs in only 10% of your subjects, your confidence in a Pass Test outcome is extremely high (NPV = .99) but your confidence in a Fail Test outcome is poor (PPV = .50). Half of the subjects who failed the test are actually Innocent. This is because the opportunity to make an error with an Innocent subject occurs nine times for every one chance to make an error with a Guilty subject. If an agency selects a very low base rate target, they can expect similar results – even with a highly accurate test.

Table 3. Contingency Table with equal accuracy (90%) but a rare target (BR of Guilt = 0.1)			
Ground Truth	Pass Test	Fail test	Totals
Innocent	810 (TN)	90 (FP)	900
Guilty	10 (FN)	90 (TP)	100
Totals	820	180	1000
Outcome Confidence	**0.99 (NPV)**	**0.50 (PPV)**	

Increasing information gained by considering accuracy and base rates

To maximize the information gained from a testing situation we have to consider accuracies and base rates. We may not be able to do much in the short run to improve on testing accuracies of PDD. Test sensitivities and specificities seem fairly stable, though we can possibly make some marginal improvements. But base rates are something within our potential control. We argue one can make a reasonable initial estimate of target base rates by reviewing past PDD test results and admissions. Many agencies keep excellent records of test results and admissions and reviewing this could provide reasonable estimates of base rates for various targets. Such estimates need not be perfect as even a rough approximation would be informative.

Agencies should be cautious about testing for extreme base rate targets. It is a truism in the science of diagnostic testing (psychometrics) with tests that have error (essentially all tests), at some point the base rate will become so extreme that simply predicting the base rate extracts all of the possible information from the situation. In such a situation conducting an error prone test will actually decrease the amount of useful information you have after conducting the test. In other words, under extreme base rate situations conducting an error prone test will make you know less after running the test than what you knew before (Meehl & Rosen, 1955).

But what if we could use one technology to adjust the base rate of Guilt up or down before applying the second technology. Let's suppose you had a lot of applicants for a job where the hiring authority wanted to make very sure the applicant was being truthful. For example, a technician who will have access to highly classified communications and encryption keys. If you were not concerned with false positive rates ("throwing a lot of babies out with the bath water") you would want a very conservative testing scenario.

To consider EyeDetect and PDD for possible use in such a successive hurdle configuration we began with the accuracy estimates from the multiple EyeDetect studies conducted on the EyeDetect as described by Dr. David Raskin at the 2015 APA seminar in Chicago, Illinois (Raskin, 2015). Those rates are shown in Table 4. (To make the data comparable we are ignoring inconclusive outcomes. The numbers were taken from Dr. Raskin's Table 2, excluding Outlier Results, D Correct and T Correct.)

Table 4. Accuracy Rates for EyeDetect (Raskin, 2015) and PDD

Ground Truth	Pass Test	Fail Test
EyeDetect		
Innocent	0.88 (TN)	0.12 (FP)
Guilt	0.17 (FN)	0.83 (TP)
PDD		
Innocent	0.83 (TN)	0.27 (FP)
Guilt	0.09 (FN)	0.91 (TP)

Successive Hurdles with Equal Base Rates

Table 5 illustrates the first hurdle (Stage 1) outcome matrix for EyeDetect with equal base rate and 1000 examinations.

Table 5. 1000 EyeDetect Outcomes with equal base rates			
Ground Truth	Pass Test	Fail test	Totals
Innocent	440 (TN)	60 (FP)	500
Guilt	85 (FN)	415 (TP)	500
Totals	525	475	100
Outcome Confidence	**0.84 (NPV)**	**0.87 (PPV)**	

In our *conservative* successive hurdles model the 475 individuals who failed the EyeDetect would be eliminated at this point. The 525 individuals who passed the EyeDetect would then be tested with a PDD test to further reduce false negative results. This second hurdle (Stage 2) PDD test would produce Table 6.

Table 6. Outcomes for the 525 PDD tests run as the second hurdle			
Ground Truth	Pass Test	Fail Test	Totals
Innocent	365 (TN)	75 (FP)	440
Guilty	8 (FN)	77 (TP)	85
Totals	373	152	525
Outcome Confidence	**0.98 (NPV)**	**0.51 (PPV)**	

Recall we began the process with 500 Guilty and 500 Innocent applicants. After the two stages of different screening tests we are left with 365 Innocent and 8 Guilty applicants. We reduced the Guilty population by approximately 98%. However, the reduction in Guilty was achieved at the cost of 135 (27%) of the 500 Innocent who were eliminated by the process.

By using EyeDetect first we adjusted the base rate of Innocent applicants up and the base rate of Guilty applicants down. Another way to look at this is if you began this process as an Innocent person your likelihood of surviving the screening is about 73%, while if you started as a Guilty applicant your likelihood of surviving the process is approximately 2%.

Successive Hurdles with a Low Base Rate Target

Table 7 illustrates the outcomes with a first hurdle EyeDetect test and a target with a 10% base rate of Guilt. This may be comparable to a screening test looking for a person involved in organized crime trying to join a police force or a person trying to be hired by a company to do industrial espionage. As you can see the confidence in passing the test is quite high but the confidence in failing the test is less than chance.

Table 7. One Thousand EyeDetect Outcomes with a 10% Base Rate for Guilt.			
Ground Truth	Pass Test	Fail test	Totals
Innocent	792 (TN)	108 (FP)	900
Guilty	17 (FN)	83 (TP)	100
Totals	809	191	1000
Outcome Confidence	**0.98**	**0.43**	

Table 8 Illustrates applying the PDD as a second hurdle outcomes with the 809 people who passed the first hurdle, our *conservative* approach. Note that we have reduced the base rate of Guilt to about 2% by using EyeDetect first. We can see that our confidence in outcome for a person passing the test is extremely high, even with the low base rate target. The confidence in a failed test in the second stage is low but recall we stated a priori we were willing to lose some applicants to make very sure we hired as few Guilty as possible.

Table 8. Outcomes for the 809 PDD tests run as the second hurdle			
Ground Truth	Pass Test	Fail Test	Totals
Innocent	657	135	792
Guilty	2	15	17
Totals	659	150	809
Outcome Confidence	**0.997**	**0.10**	

In this low base rate example, the screener began with 100 Guilty applicants and ended the two hurdle process with only two. This was done at a cost of eliminating from consideration 243 of 900 Innocent applicants. Another way of looking at this is to look at survival across the two tests. With the Innocent 900 who began the screening and 657 survived. Thus, as an Innocent applicant your likelihood of surviving this screening process would be 73%. However, for the Guilty 100 who began the process and only two survived, a likelihood of survival of 2%. A review of tables 6 and 8 shows the survival rates are quite similar across the two base rate conditions, thanks to the successive hurdles process.

Using EyeDetect to Adjust Base Rates prior to PDD Testing

The examples given above prioritized minimizing the number of Guilty who survive the screening process. Our examples show that eliminating Guilty applicants can be done quite effectively in a two hurdle process. However, eliminating Guilty necessarily involves eliminating some number of Innocent applicants who inevitably fail the fallible tests.

Different end users may place different priorities on who they want to eliminate from consideration. We could have easily reversed the process and placed a priority on reducing false positive outcomes. This *liberal* approach would of course come at the cost of increased false negative rates. The methodology provided here shows a process for formally assessing the costs and benefits of different screening processes. We encourage end users to consider their testing goals and adjust targets and base rates to achieve them. One of the greatest values we see in EyeDetect is providing an empirically proven manner of adjusting base rates to improve PDD screening outcomes. This adjunct technology allows screening programs to engage in a true successive hurdles model as recommended by Meehl & Rosen (1955) when faced with imperfect tests and varying base rates.

Multiple and Successive Hurdles approach to hiring.

Texas DPS lieutenant Dr. Adam Park's Master's thesis (Park & Herndon, 2015) is reprinted in the journal *Polygraph* as "Police Cadet Attrition and Training Performance Outcomes." In it he discusses "multiple hurdles" approach which requires applicants to pass each stage of the hiring process to be considered for employment.

If, for example, during the initial recruiting interview the applicant discloses he or she smoked marijuana within the past month, they would likely be disqualified. They don't meet the minimum requirements to clear that hurdle and they don't move forward in the process. Likewise, an applicant who can't successfully complete the physical agility course will probably not move on in the process. Subsequent hurdles become more invasive and more expensive. It seems best to weed out unqualified applicants as early as possible to be fiscally responsible and to improve the odds that the qualified candidates get a better chance at being hired.

"Successive hurdles" is an approach used to compensate for imperfect testing techniques. A successive hurdles approach would start with a technology having either good sensitivity or specificity to the issue of concern, depending on testing goals. If there is a positive or negative result (in this case a passed or failed aspect of an early hurdle) a more specific testing tool is used to try to confirm or disconfirm the area of concern. Historically PDD examiners use a single-issue screening PDD test to follow-up on positive multiple-issue screenings tests. Research has not supported the single-issue screening test is better able to identify areas of concern. It would seem that using alternative technologies to follow up failed hurdles might be a better approach in a successive hurdles model. Also, as we have tried to point out, adjusting base rates with alternative technologies as a first stage is more efficacious than trying to improve PDD accuracy.

Assuming it has accuracy levels stated above, EyeDetect would be a good addition to any multiple hurdles and/or successive hurdles hiring program that uses PDD. Polygraph testing is more intrusive and more time consuming, but it is the most powerful tool for finding out the disqualifying information. EyeDetect seems best suited as an early hurdle for those applicants who claim to have no disqualifying acts in their history. The reported sensitivity and specificity is as high, or higher, than PDD.

The EyeDetect testing process and milieu is not designed to get disqualifying information from the applicant. It is an early interview hurdle - much better than a human to human interview where ability to detect deception hovers near chance (54%, Bond & DePaulo, 2006). EyeDetect can be used to more quickly move forward those applicants or test subjects who have not (or are likely to have not) committed disqualifying acts and thus alter the base rate of guilt subjected to the more expensive PDD testing. EyeDetect would also seem to have the potential to be used as an early risk assessment tool in Post-Conviction Sex Offender testing as well. Using EyeDetect could help quickly identify those test subjects who may need to be further investigated with the PDD, or other means, by the treatment team. By altering the base rate of guilt subjects moving to PDD we can make our confidence in a test result higher.

Finally, having alternative technologies can help defend against claims of unfair testing processes in hiring. Should an applicant or test subject fail PDD after failing EyeDetect, a hiring authority, probation officer, or treatment provider would seem to be in a more defensible position to explain to the subject that they employed multiple technologies to try to clear the disqualifying behavior hurdle. As we have shown, the use multiple testing technologies can reduce the final overall error rates that are most important to the screening agency. While no test is perfect, having multiple technologies is safer for the decision maker and the applicant than a single technology approach.

References:

Bond, C. F., & DePaulo, B. M. (2006). Accuracy of deception judgments. *Personality and Social Psychology Review*, *10*, 214-234.

Meehl, P. E., & Rosen, A. (1955). Antecedent probability and the efficiency of psychometric signs, patterns, or cutting scores. *Psychological Bulletin*, *52*, 194-216.

Park, A., & Herndon, J. (2015). Police Cadet Attrition and Training Performance Outcomes. Polygraph 44(2), 143-161.

Raskin, D. C. (2015, September). The Utah Technique, Presentation at the Presented at the American Polygraph Association 50th Annual Seminar, Chicago, IL.

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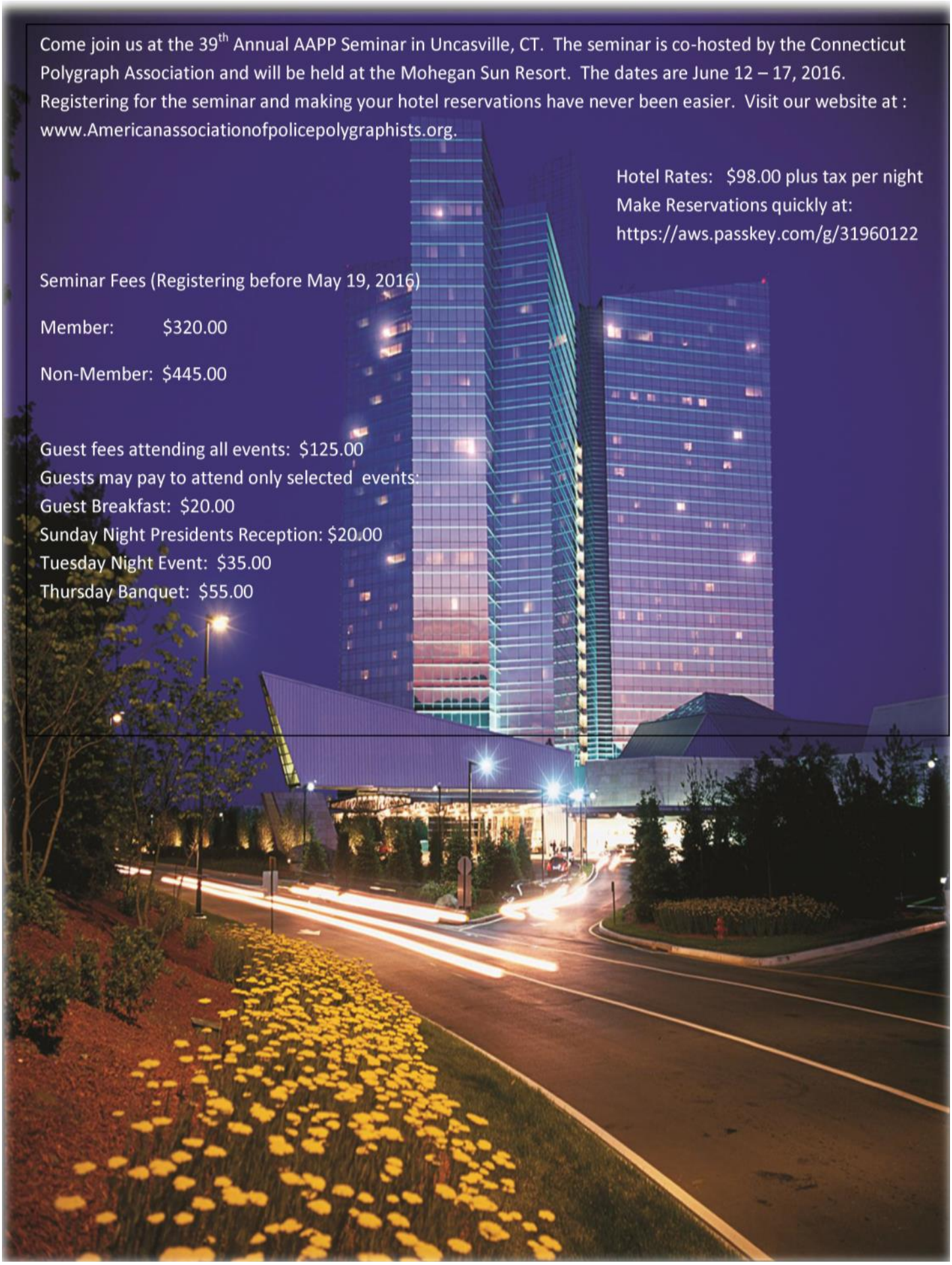
Come join us at the 39th Annual AAPP Seminar in Uncasville, CT. The seminar is co-hosted by the Connecticut Polygraph Association and will be held at the Mohegan Sun Resort. The dates are June 12 – 17, 2016. Registering for the seminar and making your hotel reservations have never been easier. Visit our website at : www.Americanassociationofpolicepolygraphists.org.
Hotel Rates: $98.00 plus tax per night
Make Reservations quickly at:
https://aws.passkey.com/g/31960122
Seminar Fees (Registering before May 19, 2016)
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Non-Member: $445.00
Guest fees attending all events: $125.00
Guests may pay to attend only selected events:
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Tuesday Night Event: $35.00
Thursday Banquet: $55.00

AMERICAN ASSOCIATION OF POLICE POLYGRAPHISTS

Polygraph Schools Recognized by the AAPP

&

2016 Training Schedules

Academy of Polygraph Science

8695 College Parkway, Suite 2160
Fort Myers, FL 33919
Phone: 630-258-9030
Director: Benjamin Blalock
Email: Ben@StoeltingCo.com or otwytma@gmail.com
Website: http://www.apsPolygraphSchool.com

Basic Examiner's Course
Fort Myers, Florida
January 11 - March 18, 2016
April 25 - July 1, 2016
September 12 - November 18, 2016

Maricopa County, AZ
January 11 - March 18, 2016

Post Conviction Sexual Offender Training Course
Fort Myers, Florida
March 21 - 25, 2016

Advanced Examiner's Course
Fort Myers, Florida
March 28 - April 1, 2016

San Diego, California
April 11 - April 15, 2016

Academy of Polygraph Science Latin America, Inc.

12945 Seminole Blvd, Building One, Suite 15
Largo, FL 33778-2315
Director: Arno Horvath
Phone: (727) 531-3782
Phone: (727) 433-6266
Fax: (727) 286-6140
Email: polygraphacademy@hotmail.com
Website: www.abhpolygraphscience.com

American International Institute of Polygraph

P.O. Box 2008
619 Highway 138 West
Stockbridge, GA 30281
Toll free: 866-477-5180
Fax:770-960-1377
Local: 770-690-1377
Email school: AIIP@Qpolygraph.com
Director: CHUCK@Qpolygraph.com
Manager: XAN@Qpolygraph.com
Website: www.polygraphschool.com

Basic Examiner's Course
Stockbridge, GA
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861 6th Ave, Suite 403
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Office: (619) 233-6669
Fax: (619) 233-3441
Main Office e-mail: CleveBackster@cs.com
Greg's Desk e-mail: BacksterPolygraph@Cox.net
iPhone/iPad e-mail: gca1265@me.com
Website: http://www.backster.net/

Go to website for schedule of:

- **Basic Examiner's Course**
- **Post Conviction Sexual Offender Training Course**
- **Advanced 30 hour PCSOT ***
- **Sexual Assault Polygraph Testing for Law Enforcement**

(Dates and Locations TBA)

Behavioral Measures UK, Polygraph Training Centre

Behavioral Measures & Forensic Services Southwest, Inc.
1720 Regal Row, Suite 120
Dallas, TX 75235
Director: Donnie W. Dutton
Phone: (972) 437-4597
Email: accounting@behavioralmeasures.com
Website: www.behavioralmeasures.com

Canadian Police College Polygraph School

1 Sandridge Road
Ottawa Ontario Canada
PO Box 8900 KIG 3J2
Desk: 613-998-0886
Fax: 613-990-8588
Director: Sgt. Eric Hendriks
Website: www.ccp.gc.ca

Basic Examiner's Course
CPC Ottawa, Canada
September 12 – November 24, 2016

The Instituto Latinoamericano de Poligrafia Mexico

Genova No. 33, Despacho 503
Col. Juarez del Cuauhtemoc
06600, Mexico
Director: Sandra Zambano
Phone : (305) 445-1653 or (+55) 5208-7823
Email: Lpi2007@gmail.com
Website: www.ilpm.com.mx

International Academy of Polygraph

1835 South Perimeter Road, Suite 125
Fort Lauderdale, FL 33309
Director: Michelle Hoff
Phone: (954) 771-6900
Email: iap@deception.com
Website www.deception.com

International Polygraph Training Center

Colima No. 385-2
Colonia Roma Norte
Mexico DF 06700
Director: Raymond Nelson
US Phone: 303-587-0599
E-mail: raymond.nelson@gmail.com

Latin American Polygraph Institute

Carrera 46 #93-70 Barrio La Castellana
Bogota, Colombia
Director: Sidney Wise Arias
Phone: Bogota (571) 482-9421 or
Direct from USA: (305) 432-4077
US Address: 730 Coral Way, Suite 102
Coral Gables, FL 33134
Email: swarias@bellsouth.net
Website: http://www.latinamericanpolygraph.com/

Basic Examiner's Course
Bogota, Colombia
January 25 - May 21, 2016 (Day & Night Classes available)
March 7 - July 2, 2016 (Night)
May 2 - September 4, 2016 (Day & Night Classes available)
May 16 - September 10, 2016 (Night)
July 25 - November 19, 2016 (Night)
August 22 - Dec. 18, 2016 (Day & Night Classes available)

Marston Polygraph Academy

390 Orange Show Lane
San Bernardino, CA 92408
Director: Thomas M. Kelly
Phone: 877-627-2223
Email: mail@marstonpolygraphacademy.com
Website: www.marstonpolygraphacademy.com

Basic Examiner's Course *
January 11 - March 18, 2016
April 11 - June 17, 2016
July 11 - September 16, 2016
October 3 - December 9, 2016

Post Conviction Sexual Offender Training Course *
March 21 - 25, 2016

* All classes will be held in San Bernardino, California.

Maryland Institute of Criminal Justice

8424 Veterans Highway, Suite 3
Millersville, Maryland 21108-0458
Director: Billy H. Thompson and Vickie Murphy Carr
Phone: 410-987-6665 or 800-493-8181
Fax: 410-987-4808
E-mail: mdmicj@aol.com
Website: http://www.micj.com

Basic Examiner's Course *
January 4 - March 11, 2016
April 4 - June 10, 2016
September 12 - November 18, 2016

Post Conviction Sexual Offender Training Course *
November 16 - 20, 2015
March 14 - 18, 2016

*All classes held at MICJ, Millersville, Maryland

National Center for Credibility Assessment

7540 Pickens Avenue
Fort Jackson, SC 29207
Director: William Norris
Phone: 803-751-9100
Fax: 803-751-9108
E-mail: William.Norris@ncca.mil
Website: http://www.ncca.mil

Basic Examiner's Course
Ft Jackson, South Carolina
January 5 - April 6, 2016
March 22 - June 21, 2016
June 7 - September 7, 2016
August 16 - November 17, 2016

National Polygraph Academy

1890 Star Shoot Parkway, Suite 170-366 nu
Lexington, KY 40509
Director: Pam Shaw
Phone: 859-494-7429
E-mail: shaw.national@gmail.com
Website: www.nationalpolygraphacademy.com

Basic Examiner's Course
Little Rock, Arkansas
January 11 - March 18, 2016
Lafayette, Indiana
March 21 - May 27, 2016
Jefferson City, Missouri
September 12 - November 18, 2016

Post Conviction Sexual Offender Training Course
Carson City, NV
November 30 - December 4, 2015

Advanced Continuing Ed (Interview & Interrogation)
Amarillo, TX
December 9 - December 11, 2015

New England Polygraph Institute

P.O. Box 825
Center Harbor, NH 03226
Director: David J. Crawford
Phone: 603-253-8002
E-mail: kacdc@worldpath.net
Website: www.newenglandpolygraphinstitute.com

Basic Examiner's Course
Center Harbor, New Hampshire
February 15 - April 22, 2016
September 12 - November 18, 2016

Post Conviction Sexual Offender Training Course
Basic and Advanced (Tentative - refer to website for more information)

NCTC Polygraph Training Institute

c/o Dept. of Military & Veterans Affairs Building 8-64
Fort Indiantown Gap
Annville, PA 17003-5002
Director: Elmer Criswell
Phone: 717-673-9345 or 877-806-6293
Fax: 717-861-2070
E-mail: lietestec@aol.com
Website: http://www.counterdrug.org

Basic Examiner's Course
Annville, PA
January 5, 2016 (90 day course)

Polygraph School of Science, Inc.

202 E. McDowell Road, Suite 258
Phoenix Arizona 85004
Office: (602) 272-8123
Fax: (602) 272-9735
Email School: Office@azpeinc.com
Email Director: l.wells@azpeinc.com

Texas Department of Public Safety Law Enforcement Polygraph School

PO Box 4087
Austin, Texas 78773-0001
Director: Brian Vaughan
Phone: 512-424-2200
Fax: 512-424-7166
E-mail: Felicia.Ruiz@dps.texas.gov

Basic Examiner's Course
No classes scheduled for 2016

Advanced Continuing Education
Austin, Texas
February 22 - February 26, 2016
May 10 - May 12, 2016
August 8 - August 12, 2016
November 8 - November 10, 2016

The Polygraph Institute

19179 Blanco, Ste 105-812
San Antonio, TX 78258 (mailing address)
10223 McAllister Fwy, Suite 201
San Antonio, TX 78216 (physical address)
Director: J. Patrick O'Burke
Office: 817-290-0033 or 210-377-0200
Fax: 210-481-7639
Website: www.thepolygraphinstitute.com

Basic Examiner's Course
San Antonio, Texas
February 22 - April 29, 2016
August - October (exact dated TBD)

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San Antonio, Texas
November 30 - December 4, 2015
May 2 - May 6, 2016
Michigan
December 7 - December 11, 2015

TDLR CONTINUING EDUCATION COURSE:
San Antonio, Texas
December 1, 2016 (Call for additional information)
(Check website for more details

Virginia School of Polygraph

7885 Coppermine Drive
Manassas, VA 20136
Director: Daryl L. DeBow
Phone: 703-396-7659 & 571-435-1207
E-mail: polygraph1@verizon.net or
info@virginiaschoolofpolygraph.com
Website: http://www.virginiaschoolofpolygraph.com

Basic Examiner's Course

Manassas, Virginia

March 7 - May 13, 2016

A Literature Review of Polygraph Countermeasures and the Comparison Question Technique

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Texas Department of Public Safety

Authors' note:

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Abstract

We reviewed the research of countermeasures effect on the comparison question technique. We provide a consolidation of countermeasure literature as well as an operational definition and taxonomy of countermeasures. We surveyed the pertinent literature regarding the effectiveness and limitations of certain countermeasure tactics. We offer evidence-based answers are to common countermeasures questions and make recommendations for reporting countermeasures.

Keywords: countermeasures, polygraph comparison question technique

A Literature Review of Polygraph Countermeasures and the Comparison Question Technique

In order for a countermeasure to be effective in a Comparison Question Technique (CQT), it must satisfy two requirements. First, it must create a sufficient difference in the polygraph measurements to comparison and relevant questions to produce a truthful or inconclusive outcome. Secondly, it must be done covertly as to not be identified by the examiner, an observer, or any quality control review. In considering what information would be most helpful to examiners we provide evidence-based answers to some important questions about countermeasures.

Our operational definition of "countermeasure"?

There have been a number of proposed definitions from within and outside of the profession for the term countermeasure (CM). We needed to operationally define CM as it applies to polygraph testing. For our purposes, we considered a CM to be anything a test subject does in an attempt to alter the test data so as to produce a truthful (negative) test result. This definition encompasses the truthful subjects trying to ensure a True Negative (TN) result and the deceptive subjects trying to produce a False Negative (FN) outcome. One could ostensibly argue that all subjects engage in some form of behavior to produce truthful outcomes and are thus attempting CMs - the truthful tell the truth and the deceptive lie, but we feel these actions don't fit our definition for altering the test data. To alter means *to change or make different* in a meaningful way.

What type of CMs do people use?

We followed Honts' (1987) taxonomy as it breaks down CMs into categories that have been researched, though others have produced different recommendations for CM categorization (see Krapohl, 2009). In following Honts (1987) we break CMs down into the following categories;

1. General State CMs- actions intended to alter the subject's psychological state and/or measured physiological responses throughout the entire examination. They include such things as; drugs, relaxation, or interfering agents. They are not focused on any specific point in the testing.

2. Specific Point CMs- as their name suggests, these are actions the subject takes at specific points in the testing process. They can be attempts to reduce responses to relevant questions but are usually efforts to increase responses to comparison questions. They can be employed physically, mentally or in combination.

3. Spontaneous CMs- these are CMs that subjects report doing without planning or forethought. A number of laboratory studies debriefed subjects about efforts to produce truthful outcomes. These debriefs are the source of most of our knowledge of spontaneous CMs. Subjects report trying such things as; relaxation, rationalization, imagery, attempts to control their breathing or heart rate, trying to stay calm, biting their tongue and pressing their toes at random places.

4. Information CMs- people who know they are going to take a polygraph examination (both guilty and innocent) often seek information about polygraph techniques and CMs from the internet or other sources. This information-seeking can be motivated by an attempt to satisfy curiosity, to try and hide deception, or in an effort to ensure that truthfulness is obvious.

Given our operational definition and taxonomy we sought to provide evidence-based answers to some important questions about CMs. Evidence-based answers and practices concerning CMs are not simple. They have to be based upon research and not on anecdote or dogma. Evidence-based answers and practices have to be qualified by the limitations of the research upon which they are based. Those qualifications depend on such things as whether the subjects were coached or if they received practice on an instrument. Who were the subjects? Did the examiner use some sort of activity sensor? The following is a summary of some findings from the peer-reviewed published studies we examined for this paper.

1. Rovner (1986) is a rewrite of his 1979 doctoral dissertation in which he trained subjects on the principles of CQT testing, including giving them pictorial examples of reactions. He called these the *Info group*. He also gave the *Info group* Specific Point CM training using a variety of physical and mental CMs known to produce reactions. He had a second group called the *Info + Practice group*. He gave them the same material but allowed them to practice their CMs on a polygraph before their real test. The accuracy of the results for the control and the *Info group* was about 88%. However, the *Info + Practice group* accuracy results were about 62%. He did not report using an activity sensor or making attempts to identify CM subjects.

2. Dawson (1980) used Stanislavsky trained actors to attempt General State CMs in a mock-crime lab study. They were not trained in polygraph principles and they did not receive practice. The CM group actors were motivated to appear innocent to display their superior acting skills. CM deceptive subjects said they used imagery and prior memories as strategies. The General State CM effects were ineffective. Excluding inconclusive results, all CM subjects were found deceptive.

   A side note, Dawson conducted an interesting additional experiment. He had subjects answer the polygraph questions in two ways, immediately after the question and delayed by 8 seconds. He measured responses in three ways; after the question without an answer, after the immediate answer and after the delayed answer. Based on numerical scores he reported the following. Immediate answers accuracy was 75%correct, 12% incorrect, and 12% inconclusive. The measurements following the question but before the delayed answer produced 83% correct, 8% incorrect, and 8% inconclusive. The measurements taken after the delayed answer resulted in 29% correct, 8% incorrect, and 62% inconclusive.

3. Bradley & Ainsworth (1984) tested General State CMs by using alcohol intoxication during a crime act and also during polygraph testing. They tested subjects with the CQT and the CIT. We limit our discussion to the CQT findings. They measured heartrate, respiration and electrodermal responses during a mock-crime robbery and shooting. They reported alcohol intoxication during the crime decreased detectability with electrodermal activity. Intoxication during the testing was ineffective.

4. Honts, Hodes & Raskin (1985) in experiment 1 trained the CM group on the principles of polygraph CQT and Specific Point CMs. They coached the subjects on physical (press toes to floor) and pain (bite tongue) CMs. They did not get any practice on an instrument. They used a photoelectric plethysmograph instead of a cardio cuff. They reported no significant effects for the CM group. They were unable to detect which subjects used CMs by either direct observation or reviewing the charts. They did not use an activity sensor.

5. Honts, Hodes & Raskin (1985) in experiment 2 trained the CM group on the principles of polygraph CQT and Specific Point CMs. There they coached the subjects on physical (press toes to floor) and pain (bite tongue) CMs. However, unlike experiment 1, these CM subjects got to practice on an instrument. They used a standard cardio cuff in this experiment. They reported there was a 47% FN rate for the CM group. Again they were unable

to detect which subjects used CMs by either direct observation or reviewing the charts. They did not use an activity sensor.

6. Honts, Raskin, & Kircher (1987) trained subjects in physical (press toes to floor) and pain (bite tongue) Specific Point CMs. They gave the subjects training on CQT principles and coaching on when and how to apply the CMs to the comparison questions. They did not give any practice on an instrument. They measured muscle movement by electromyography (EMG) on the subjects' jaw and calf. They reported no FNs with the guilty control group who did not use any CMs. They identified 78% of the truthful subjects correctly. Seventy percent of the guilty CM group produced FN results. They identified 90% of the CM subjects by EMG tracings.

7. Honts, Raskin, Kircher & Hodes (1988) included 65 deceptive subjects from four studies who were debriefed about any use of Spontaneous CMs. Sixty percent (39/65) of the deceptive subjects admitted to Spontaneous CMs. The strategies included: relaxation, rationalization, self-deception, disassociation, imagery, attempts to control breathing or heartrate, biting tongue, attempts to control general physiological responses and pressing toes to the floor. Blind scoring accuracy was 80% correct, 3% wrong and 17% inconclusive. The use of Spontaneous CMs did not affect the test results. Examiners were unable to differentiate CM users. No activity sensor was used.

8. Raskin and Kircher (1990) trained subjects in physical (muscle contraction) and mental (counting backwards) Specific Point CMs. They taught them the principles of polygraph testing and when they should employ the CMs. They coached them and they had practice on an instrument. They used a seat activity sensor. The CMs produced about 50% FNs when scored by the computer. All of the physical CMs were identified by reviewing the seat sensor data.

   They also trained a "relaxation" group on the principles of polygraph. This group used autogenic relaxation as a General State CM throughout the entire examination. The relaxation General State CMs were not effective.

9. Honts, Raskin & Kircher (1994) trained subjects in Specific Point CMs and CQT polygraph principles. Here they used physical (muscle contraction), pain (bite tongue) and mental (counting backwards) CMs during the comparison questions. The subjects were coached but not given any practice on the polygraph instrument. They measured EMG on the jaw and calf. The CM group produced a 50% FN rate and were not detected by direct observation or by looking at the polygraph charts. They were able to identify the pain and physical CM groups by EMG scores which were significantly larger than the other groups.

10. O'Toole et al., (1994) was a partial replication of the Bradley & Ainsworth (1984) study on General State CMs using alcohol. Here the deceptive CM group were intoxicated only during the mock-crime theft. They measured skin conductance, respiration and finger pulse amplitude. They did not provide any information on polygraph principles, they did not coach or practice any CMs with the CM subjects. Alcohol intoxication during the crime had no effect on polygraph results.

11. Honts, Amato and Gordon (2001) did not train any of their subjects but debriefed them on what actions they took to help pass their polygraph tests in a large lab study. Overall 68% of the subjects reported they attempted a Spontaneous CM. Almost half of the truthful subjects (46%) reported using at least one Spontaneous CM. These Spontaneous CMs included altered breathing, mental and physical strategies. The Spontaneous CMs did not affect the deceptive scores but it shifted the truthful scores in a negative direction. In other words, the truthful subjects who tried to help increase their chance of a TN result had less truthful scores than those who did not attempt Spontaneous CMs. These subjects

were not coached, nor were they given practice tests on an instrument. There was no activity sensor used in any of these cases.

Later, three federally certified instructors reviewed the charts in an effort to identify the presence of CMs. None of the three federally trained instructors could identify the CM subjects at better than chance levels by reviewing the test data.

12. Oglivie & Dutton (2008) reanalyzed unpublished data from a CM lab experiment with and without the activity sensor tracing. In this case the activity sensors included, seat, feet and arm sensors. The CM polygraph subjects in these cases received a copy of the internet publication of *The Lie Behind the Lie Detector* (Maschke & Scalabrini, 2002) as a reference. This material has detailed descriptions of CQT polygraph principles and CM strategies. The CM subjects had to pass a written examination on the CM material before proceeding. They used physical (toe curling) Specific Point CMs during the presentation of the comparison questions. A subset of the CM group was allowed to practice on an instrument while receiving real-time feedback from an experienced examiner.

    Five experienced polygraph examiners reviewed the polygraph charts in two conditions; with and without the activity sensor data. The examiners were asked; a) to score the test data using a 7-position federal scoring rules, and b) using a 5-point Likert scale rate the absence or presence of CMs.

    Mean CM present/absent scores were statistically significant between the sensor and no-sensor conditions. Without the activity sensor, the CM present/absent scores were near zero. Examiners did not perform above chance levels when relying on the traditional polygraph channel data to identify CMs without the activity sensor data. Adding the activity sensor data made identifying the CM group more likely.

    Of note, the average guilty CM total scores with the activity sensor was similar to the truthful scores (they were positive). The average guilty CM total scores without the activity sensor was double the average truthful scores. This suggests that the Specific Point CM strategies can create increased FN results.

13. Honts & Reavy (2015) did not train any of their subjects but debriefed them on what actions they took to help pass their polygraph tests in a large lab study. Overall 48% of the subjects reported they attempted a Spontaneous CM. About 50% of the subjects who received probable lie comparison questions (PLC) reported Spontaneous CMs. For the directed lie comparison question variant (DLC) subjects, about 46% reported Spontaneous CMs. Breaking it down by guilt, overall 78% of the deceptive group reported Spontaneous CM attempts (DLC=72%, PLC=83%). Within the truthful group 18% overall reported attempts at Spontaneous CMs (DLC=20%, PLC=15%). None of the differences were significant.

    The investigators did not make any attempt to identify CMs either through direct observation or data review. Just like in Honts, Amato, & Gordon (2001) the scores for the truthful CM groups were less positive. Once again this suggests truthful subjects who use Spontaneous CMs hurt their chances of passing the test.

14. Stephenson & Barry (1998) was not a CQT study but is discussed here due to the findings. The subjects were polygraph examiners so they had extensive knowledge about the CQT polygraph procedures and CMs. They tested whether they could identify when a subject makes a “physical movement between the toes and shoulder” while collecting polygraph test data. They used an activity sensor mounted to the front of the test subject’s chair. They collected test data in a mock acquaintance test during which the examiner counted from 1 through 10. At some point the test subject was to make a covert physical CM at-

tempt and remember the number at which they attempted the CM. They stationed an "observer" directly in front of the test subject who watched for movement. The overall CM detection rate for the examiner observing the subject was 9%. The "observer" identified the Specific Point CMs in 36% in of the cases. When they used the movement sensor tracing, the experimenters identified 85% of the CM attempts.

15. Honts & Alloway (2007) was a constructive replication of Rovner (1986) using the Test for Espionage and Sabotage (TES). They gave half of the truthful and deceptive subjects the book *The Lie Behind the Lie Detector* (Maschke & Scalabrini, 2000) to study for one week. They found no significant effect of providing the Information CM material on validity of the TES. Once again, however, those subjects who reported using CMs had significantly lower probabilities of truthful scores. This included both the truthful and the deceptive subjects.

Here we will provide some common CM questions along with evidence-based answers.

1. *Do both truthful and deceptive subjects attempt CMs?*

   The simple answer is "Yes." Research shows that both truthful and deceptive subjects report attempting Spontaneous CMs. From study 9 (Honts, Raskin & Kircher 1994) which was limited to deceptive subjects, 65% of them attempted Spontaneous CMs. From study 13 (Honts & Reavy, 2015) about half of the subjects overall reported attempting Spontaneous CMs. A larger proportion of deceptive subjects reported attempting Spontaneous CMs but 18% of truthful subjects also reported attempting Spontaneous CMs. From study 11 (Honts, Amato and Gordon, 2001) we see about 68% overall and about 50% of truthful subjects attempted Spontaneous CMs.

2. *What type of CMs do subjects attempt?*

   From a number of studies above Spontaneous CMs include a variety of reported strategies; relaxation, rationalization, self-deception, disassociation, imagery, attempts to control breathing or heartrate, biting tongue, attempts to control general physiological responses and pressing toes to the floor. Specific Point CMs generally included physical (press toes, curl toes, etc.) or pain (biting tongue) and mental (counting backwards) activities. Some Information CM sources suggest such actions as squeezing the anal sphincter (http://www.polygraph.com/). More sophisticated advice about examination behavior and chart recording CMs is offered at https://antipolygraph.org/ (Maschke & Scalabrini, 2005). Some examinees reported attempting a form of General State CMs when they describe attempts at rationalization, relaxation, disassociation, imagery, etc.

3. *What type of CMs are effective at increasing TN results, creating a FN result, or resulting in an inconclusive outcomes- and to what degree?*

   Spontaneous CM produced no effects for the deceptive subjects in terms of increased TN or inconclusive outcomes, nor were there reliable effects found in the numerical scores. Deceptive subjects in study 15 shifted the scores away from a truthful result. Spontaneous CMs by truthful subjects decreased their chances of being found truthful. Information CMs that lead to Spontaneous CMs simply shifted truthful scores in the negative direction (see study 15). General State CMs have not been shown to be effective, see study 2 and 10. Study 3 reported some effect for intoxication during the mock crime act. Specific Point CMs have been shown to be effective in shifting differential response measurements and increasing FN results (see studies 1, 4, 5, 6, 8, 9, & 12) following specific training, but not just information. Specific Point CMs thus seem to be most dangerous when coupled with hands-on training and practice.

4. *Do polygraph test subjects attempt CMs more with Directed Lie Comparison questions versus the Probable Lie variant?*

   This has not been shown by the relevant research (see study 13).

5. *Can examiners identify examinees using CMs at better than chance rates? And does the addition of activity sensors make a difference?*

   Without an activity sensor there are no studies that support examiners can identify CMs at better than chance rates (see studies 4, 5, 7, 11, & 12). In fact, the research indicates that when examiners try to identify countermeasure they falsely accuse a substantial number (47% or more) of innocent non-countermeasure users of using CMs (study 5). With an activity sensor (or EMG) polygraph examiners are able to significantly identify CM users (see studies 6, 8, 9, 12, & 14) who use CMs that required movement (for example, pressing the toes to the floor.) Finally, there is no evidence that current training in countermeasure detection is effective. In fact the alleged respiratory countermeasure signatures caused by the countermeasure materials produced by Williams (http://www.polygraph.com/) have been shown to occur naturally in a substantial number of actually innocent subjects who were not using CMs (Honts & Crawford, 2010).

6. *How does using CMs affect the scores of truthful and deceptive subjects?*

   Specific Point CMs increase FN outcomes following training by producing significant effects in all of the polygraph components depending upon the countermeasure used (see studies 1, 5, 6, 8, 9, & 12). It is unclear what their effect would be for increasing TN outcomes, though there is no reason to think they would not be effective.

   Spontaneous CMs don't increase FN and probably decrease TN results. Information CMs that lead to Spontaneous CMs would be expected to have similar results. Spontaneous CMs are extremely common with examinees and there does not appear to be any evidence that such CMs are effective. Therefore, as the evidence seems to suggest, if the data simply appears to be messy, and there is *sufficient* uncontaminated data to conduct an analysis, the scorer should attempt to analyze the uncontaminated data, and a decision should be rendered by the scorer if conclusive scores are reached (ex. NDI/NSR, DI/SR). Examiners should report when data quantity and quality are insufficient to complete a standardized numerical evaluation. An example of reporting language is:

   After assessing the quantity and quality of the test data collected in this examination, I determined that the test data were of insufficient interpretable quantity and/or quality as a result of numerous artifacts to conduct a standard numerical evaluation. In other words, there was insufficient data to evaluate in order to render a reliable decision on this examination.

General State CMs are unlikely to create a differential response between relevant and control questions that would increase TN or FN results. At worst they might be expected to cause an inconclusive result due to mitigating the overall responsivity to all test questions, but even increases in inconclusive outcomes have never been demonstrated in a published peer-reviewed study. An unpublished study (Gatchel et al., 1983) tested the General State CM effects of the beta-blocker drug propranolol. The only significant finding was an increase in accuracy with the innocent. Study 3 reported no effect for alcohol intoxication during a polygraph test. However, as mentioned, they reported an effect for intoxication at the time of the crime. The replication of that study failed to find an effect for alcohol and FN results for intoxication at the time of the crime (see study 10). In study 2 experienced actors try to produce FN results using General State CMs but produced no effect.

In summary the CM research base is incomplete and additional research is needed. However, the limited research shows trained CMs are something that should concern examiners as under certain circumstances they have produced substantial numbers of FN errors. Moreover when trained de-

ceptive subjects use CMs, examiners have not shown an ability to identify those subjects at better than chance rates without some sort of activity sensor (and then only for CMs that require physical movement). Regardless of any alleged anecdotal successes at detecting CMs, no research has shown that any examiner can reliably detect CMs from simple pattern recognition. In fact, as mentioned, research has shown that the respiratory patterns that are allegedly linked to some internet training approaches occur naturally in the respiration recordings of a substantial number of actually innocent subjects (Honts & Crawford, 2010).

We realize a number of things that might be CMs appear spontaneously among truthful examinees. What may distinguish these events from CMs, though, is the frequency or the targeting of the behaviors. For example, both truthful and deceptive examinees move during polygraph tests. This does not, in and of itself, mean that movements are not useful in detecting CM attempts. Indeed, research shows that movements can be strong indicators in that regard. The mere presence of hyperventilation, as another example, does not confirm CMs, but if they persist despite examiner warnings or they seem to appear only on one category of question, then they can be useful indicators. Ultimately we hope further research will help develop improved objective measures of anomalies among groups of questions. Future CM detection efforts should probably seek such an objective measurement approach.

The research clearly shows that when examiners do try to detect CMs they falsely accuse a substantial number of actually innocent subjects. Examiners should be extremely cautious about reporting CMs based on their ability to intuit a subject has used CMs. Doing so puts the innocent at risk. The upside to this literature is that when deceptive subjects engage in CMs that require movement they can be reliably identified when examiners use an activity sensor. Finally, there is no published research that information provided by internet CM websites is at all dangerous to the validity of the CQT.

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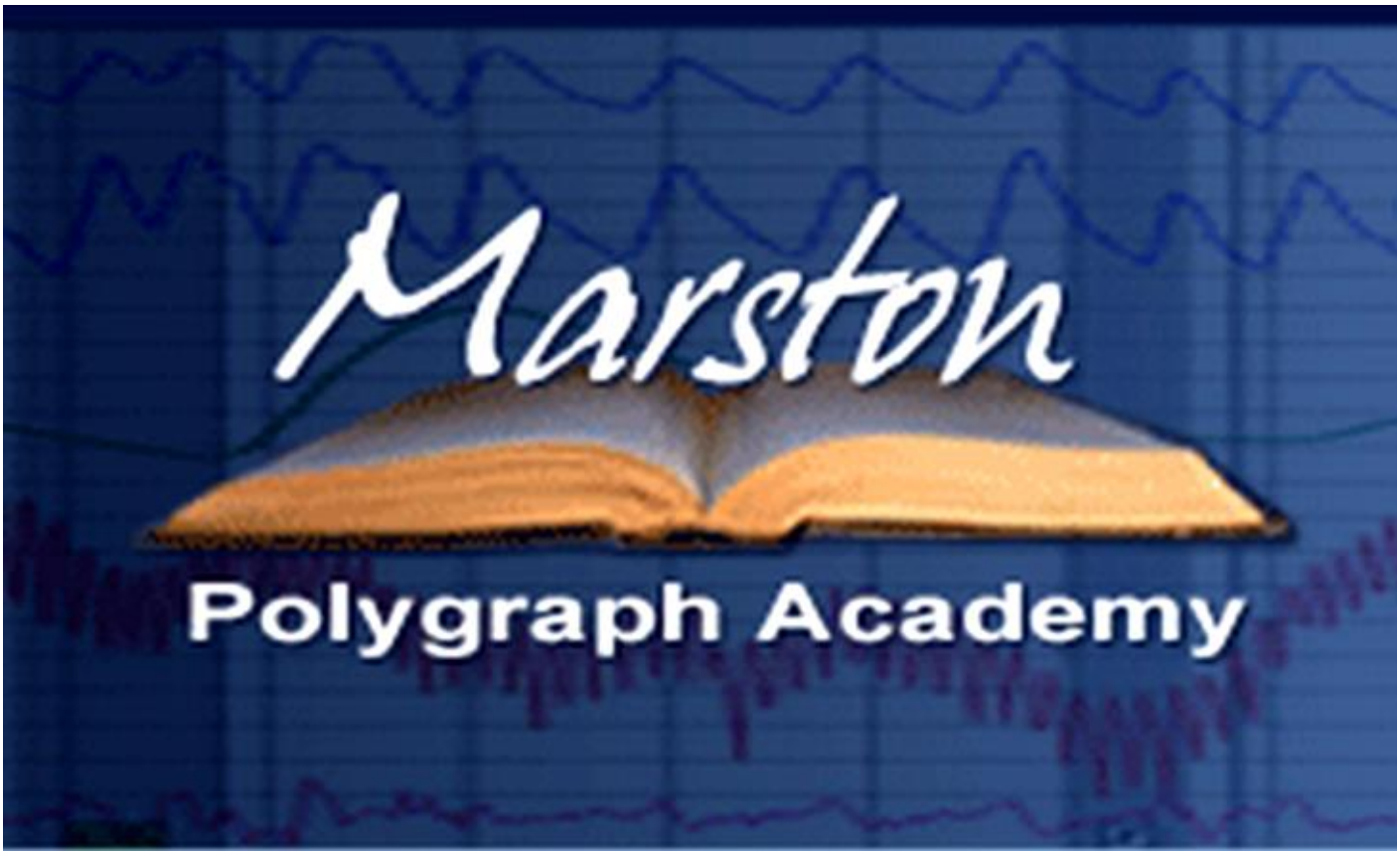
Examiners may find Table 1 a quick reference for a consolidation of the CM study data. Note Honts et al., 1988 is not included in the table as those results were derived from included studies.

Table 1 – On next page

Table 1 – Breakdown of CM study findings.

Study	**Test type**	**Type of CM**	**Training Y/N**	**Coached/ Practice on inst. Y/N**	**Activity Sensor Y/N**	**Findings reported**
Rovner (1986)	CQT	Practice CM group used physical and mental CMs. They got to practice and received feedback.	Info group and info + practice group All given extensive training on polygraph principles and CN strategies	Coached-yes Practice-yes	No	Accuracy of scoring: Standard group = 87.5%; Info group = 87.5%; Info+practice group = 62.5%
Dawson (1980)	CQT	General State CMs	No	No	No	General State CMs had no effect.
Bradley & Ainsworth (1984)	Limited to CQT part	General state CMs-alcohol intox during crime and during polygraph	No	No	No	No effect for intox during testing. EDA responses were reduced for intox during crime scenario.
Honts, Hodes & Raskin (1985) Experiment number 1	CQT	CM groups used: 1.Bite tongue or 2.muscle contraction press toes to floor	All given extensive training on polygraph principles and CN strategies	Coached-yes Practice-no	No Also no BP cuff used in experiment 1	No significant effects for CMs found. Unable to detect CM subjects through chart interpretation or observation.
Honts, Hodes & Raskin (1985) Experiment number 2	CQT	CM groups used: 1.Bite tongue or 2.muscle contraction press toes to floor	All given extensive training on polygraph principles and CN strategies	Coached – Yes Practice-Yes	No	47% FN for CM groups. Unable to detect CM subjects through chart interpretation or observation.
Honts, Raskin & Kircher (1987)	CQT	CM group used: bite tongue & press toes to floor	Yes CM group trained on polygraph principles and CM strategy	Coached-yes Practice-no	Yes EMG on the jaw and leg.	No FN with Guilty control. 78% innocent correct. 70% FNs. 90 % of CM subjects identified with the EMG tracings.
Raskin & Kircher (1990)	CQT	CM group used: Physical-muscle contraction PLUS Mental Counting backwards Relaxation group used: mental imagery	Yes CM group and relaxation group trained on polygraph principles and CMs. Practice recording, practice logs,	Coached-yes Practice-no	Yes seat sensor	Computer: CM group =50% FN. Relax not effective. All physical CM subjects identified by activity sensor.
Study	Test type	Type of CM	Training Y/N	Coached/ Practice on inst. Y/N	Activity Sensor Y/N	Findings reported
Honts, Raskin & Kircher (1994)	CQT	CM group used: Physical-muscle contraction Pain bite tongue Mental group: Counting backwards	All given extensive training on polygraph principles and CN strategies	Coached-yes Practice-no	EMG-jaw and calf	FN= 50% for Mental & Phys. CM Unable to detect CMs by observation or chart tracing EMG measures for CM groups were significantly larger than controls.

O'Toole et al. (1994)	Limited to CQT part	General state CMs- alcohol intox during crime	No	No	No	No effect for intox during crime
Honts, Amato & Gordon (2001)	CQT	All CMs were spontaneous- Some subjects used more than one. 32%-breathing 76%-mental 10% physical	No	Coached-no Practice-no	No	3 DoDPI instructors did not identify presence of CMs above chance level. 47% of CM present decisions were on truthful subjects.
Oglivie & Dutton (2008)	CQT	Physical CMs: Toe curling	All given extensive training on polygraph principles and CN strategies	Coached-yes Practice yes for a subset	Compared with and without seat, feet, and arm activity sensor data. 15 Innocent. & guilty control and 38 CMs. Charts printed with and without activity trace.	Five scorers looked at 68 cases Mean activity sensor scores significant for CM group with and without sensor. Unable to determine presence of CMs without the sensor data.
Honts & Reavy (2015)	CQT	spontaneous	no	no	yes	No attempt to identify CMs. 48% attempted CM PLC=50%; DLC=46% 78% Guilty attempted PLC 83%; DLC 72% 18% Innocent attempted PLC 15%; DLC20% Truthful scores less positive when CMs attempted
Stephenson & Barry (1988)	Examiner counted 1-10 and	Subject made a physical movement between the toes and shoulder	Info yes because it was an examiner.	Coached-yes because it was an examiner. Practice-yes	Yes-used Lafayette chair with activity sensor bar under the front legs	Had an observer in front of subject in addition to examiner. CM detection rates were: Examiner=9%; observer=36%; movement sensor tracing= 85%
Honts & Alloway (2007)	CQT	Information and Spontaneous CMs	No	No	Yes under the chair legs	No effect on FN Deceptive and Truthful CM subjects' probabilities scores moved away from truthful-



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The Vasomotor Response in the Comparison Question Test

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Abstract

We tested an algorithm-based assessment tool for measuring vasomotor responses generated with a photoelectric plethysmograph in a mock crime laboratory experiment. Ten students completing their basic polygraph training participated in the study as examiners and as test subjects. Forty examinations were conducted and analyzed. Empirical Scoring System (ESS, Nelson et al., 2011) scores for the vasomotor response significantly predicted guilt and innocence and were more strongly correlated with the Guilt Criterion than were blood pressure and respiration. Discriminant analysis of our data produced a three-variable solution ordering the predictors (strongest first), electrodermal, vasomotor, and blood pressure. Respiration did not contribute significantly to the solution and was not included in the model. On N - 1 cross validation, our discriminant analysis model correctly classified 92.5% of the examinations. These results are consistent with a large body of research that shows the vasomotor response to be a valuable contribution to physiological deception detection. Examiners are urged to adopt its use.

Keywords: *vasomotor response, photoelectric plethysmograph, finger pulse amplitude, directed-lie comparison test.*

The Vasomotor Response in the Comparison Question Test

For over 50 years researchers studied the vasomotor response as a predictive measure in deception detection (for early examples see, Kubis, 1962; Podlesny & Raskin, 1978). Typically the vasomotor response is measured with a photo-electric plethysmograph placed on a finger or thumb. Finger pulse amplitude (FPA, high-pass filter) and finger blood volume (unfiltered) measures of vasomotor activity (Podlesny and Raskin, 1978) were both examined with finger pulse amplitude generally having been shown to be the stronger and more easily scored measure (Kircher, 1983).

Measures of the vasomotor response provided statistically significant discrimination between guilty and innocent subjects in a number of previous studies of the comparison question test (Barland & Raskin, 1975; Honts, Amato & Gordon, 2000; Honts & Reavy, 2015; Horowitz, Kircher, Honts & Raskin, 1997; Kircher & Raskin, 1988, Kircher, Packard, Bell & Bernhardt, 2005; Kubis, 1962; Podlesny & Raskin, 1978; Rovner, 1986; Raskin & Hare, 1978; Raskin & Kircher, 1990). In Kircher and Raskin (1988) the finger pulse amplitude measurement (FPA) produced a stronger correlation with guilt (.60) than did relative blood pressure (.53) and respiration (.57). Honts, Amato & Gordon (2000) reported the correlation of vasomotor numerical scores with criterion (guilt and innocence) to be 0.51, which was the same as for blood pressure. Kircher et al., (2005) reported similar FPA and blood pressure correlations for probable-lie tests (.43 versus .42). For directed-lie tests, the FPA correlation exceeded that of the blood pressure (.44 versus .31). More recently, Honts & Reavy (2015) reported that the vasomotor correlation with the criterion (.45) exceeded correlations for blood pressure (.41) and respiration (.24) and approached that of the electrodermal response (.48). Podlesny & Truslow (1993) is the only peer-reviewed

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published study we could find that did not report a significant effect for at least one feature of the vasomotor response Bell, Raskin, Honts, and Kircher (1999) and Handler (2006) describe the Utah Scoring System criteria for the FPA. The FPA criteria require visually assessing the relative differences of decrease in FPA and the duration of that decrease between relevant and comparison questions. However, a measure of vasomotor activity is not included in the test data analysis (TDA) used by the U.S. Federal Government programs (Department of Defense, 2006). The Federal program is used as a model for a number of other American Polygraph Association accredited training programs.

The vast majority of the currently available data show that adopting the FPA criteria in the numerical scoring process improves the discrimination of the truthful and deceptive in comparison question tests. What is not known is why there is resistance in the polygraph profession to incorporating the FPA criteria into numerical scoring evaluations. One reason may be a concern for the reliability of evaluating the FPA criteria due to possible subjectivity in using the scoring criteria. Trying to separate similar amplitude changes and durations might be difficult for some examiners, especially when they are new to polygraph. For this reason we sought to develop and evaluate an algorithmic assessment tool to reliably index differences in FPA reactions between questions. Thus one goal of the present study was to provide examiners with a highly reliable and easy to use means of comparing responses in their vasomotor recordings.

Method

Participants

A cohort of ten polygraph examiner trainees participated in this study as both examiner and test subject. Participants were in their tenth week (the last week) of instruction at a polygraph school accredited by the American Polygraph Association. Participation in the study was voluntary. Refusal to participate had no effect on the employment, performance grades, or training status of the participants. Nine of the ten participants were experienced law enforcement investigators with an average of more than 19 years in policing. The remaining participant had completed an undergraduate degree in social and behavioral sciences and was a retired probation officer with 27 years' experience. Eight of the participants were male. Participant ages ranged from 33 to 61, with a mean of 44.5 years.

Apparatus

The student examiners used four Lafayette Instrument Company LX-5000 and one LX-4000 computerized polygraph instruments. Thoracic and abdominal respiration was measured using standard sealed rubber pneumograph systems. Electrodermal activity (EDA) was measured as skin resistance using stainless steel electrodes attached to the distal phalanges of the left or right first and third fingers. Relative blood pressure was measured using a cuff placed on the subject's forearm or upper arm opposite from the EDA measurement. Finger pulse amplitude was measured with a photoelectric plethysmograph placed on the subject's left or right middle fingertip (on whichever hand was used to collect the EDA). A sensor located in the seat of the subject chair monitored movement activity.

The second author worked with hardware and software engineers from Lafayette Instrument Company (Lafayette, IN) to improve the plethysmograph and develop the vasomotor assessment tool we evaluated in this project. The time windows for the assessment tool were developed from research findings reported by Podlesny & Raskin (1978) and Rovner (1986). The plethysmograph used in this experiment was a Lafayette Instrument Company (Lafayette, IN) model 76604A-5L with an infrared LED bulb emitting at 950 nanometers. The electronic signal from the phototransistor was AC-coupled with a high pass filter with a cutoff of 0.5 Hz and a low pass filter with a cutoff of 10 Hz before outputting the vasomotor waveform (Finger Pulse Amplitude) for visual inspection. The raw data from the phototransistor were sampled at 30 samples per second and output to the com-

puter assessment tool for the virtual plot. For the virtual plot, the average amplitude measured for five seconds through ten seconds post-stimulus is divided by the average amplitude measured for three seconds pre-stimulus through stimulus onset to produce a "response ratio". After a question sequence is collected, the resulting response ratios are plotted so that a higher point indicates a larger response. The examiner then looks at the height of the response ratios of the comparative relevant and comparison questions to determine the score. The response ratio "points" are placed at the stimulus onset by convention. A visibly higher point indicates a greater reduction in amplitude to the test question. See Appendix D for a sample of the virtual plot and Appendix E for an example of the display from the comparable software available with Stoelting instruments.

Procedure

The design of this study for data collection was a simple two-condition, Guilty and Innocent mock crime experiment. The design was implemented using a variation of a mock crime scenario developed at the University of Utah (Podlesny & Raskin, 1978). Upon being called to an office designated by the school director, participants were asked to select one of ten envelopes. The ten envelopes had one of five guilty assignment letters (Appendix A) and five innocent assignment letters (Appendix B). Student examiners were given the option to not participate in the study and could select an alternative means of completing the practical assignment, though none opted out.

Half the participants (Innocent) were instructed to drop off an envelope contained in their selected envelope to a mailbox in a busy office area. They were told they were not to steal anything and if they could produce non-deceptive results on a series of polygraph examinations they would be placed in the running for ten extra points on their final exam grade. Participants were also cautioned against attempting to affect the results of their test by using countermeasures. They were informed that two experienced reviewers would inspect the charts they produced and if the reviewers agreed the subject used countermeasures they would lose 20 points from their final examination grade. (See Appendix A for Innocent Instructions.)

Other participants (Guilty) received instructions that assigned them to steal an envelope from the same busy office area without getting caught. There was a $20 bill inside the envelope the guilty participants "stole" and they were instructed to keep that bill on them for the remainder of the experiment and the school director would collect the bill at the conclusion of the experiment. They too were offered a ten point final examination grade incentive for producing non-deceptive test results. Guilty participants were given the same countermeasures warning the innocent subjects received. (See Appendix B for Guilty Instructions.)

A confederate surreptitiously monitored the actions of the innocent and guilty participants. All participants completed their assigned tasks without incident. Over the course of the next two days, each subject tested four of his or her classmates. The testing schedule was arranged for each student examiner to test two innocent and two guilty subjects, though the order was randomized to help hide their status. Upon reporting for testing, each student examiner followed a standard Utah comparison question test protocol (Raskin & Honts, 2002). The school director assigned each test subject to an examiner who began by collecting some information on the test subject's general health, hours of sleep from the night before, and whether they had eaten on the day of the examination. Participants were told that money had been stolen from an office and all participants denied stealing the money. The student examiners asked each test subject to described their activities in the school building, including the office from where the money was stolen.

Next the student examiners explained the function of each sensor and gave the subject an overview of the testing process, including that they might experience some discomfort as a result of the pressure in the blood pressure cuff. Each test subject then signed a waiver consenting to placement of the components and testing was then continued. Each subject was then given a practice examination to acquaint them with the testing procedures and all subjects were given positive feedback on their practice test performance (Kircher et al., 2001). The practice examination was a

known solution examination where the subject wrote the number 3 on a piece of paper with pre-printed numbers 1, 2, 4 and 5. Then the examiner asked them "Regarding the number you wrote on that paper, was it the number 1?"and continued through the number 5.

Data were collected using a single-issue three relevant question examination following the Utah protocol (Raskin & Honts, 2002). The examinations were conducted with Directed-Lie comparison questions (DLC). All examinations consisted of five repetitions of the questions with data recording (see Appendix C for questions and subjects' answers). After each data collection, the examiner released the pressure in the cuff and gave the subject about one minute of rest before adding air and collecting the next chart. After data for five repetitions were collected, the examiner removed the components and dismissed the test subject. Each student took four examinations (with one exception for a student with an excused medical absence one day who was replaced with another student programmed with the same criterion state). Half the examinations were randomly programmed guilty and a total of 40 examinations were collected. The school director or a senior instructor reviewed all data for correct collection procedures. One student examiner was asked to repeat an examination because the pretest was insufficient and did not conform to standard practices. The inadequate examination was not included in our study data analyses.

After all the data were collected the student examiners scored the tests they conducted. Their recorded results were scanned and kept as part of their school record. The individual examinations were anonymized and emailed to an experienced examiner who was aware of the approximate base rate but unaware of any subjects' assignment. The experienced examiner had displayed proficiency in numerical scoring in several prior experiments, including one where FPA was evaluated (Honts & Reavy, 2015). The experienced examiner analyzed the data using the ESS for the respiration, EDA and cardio components and used the vasomotor assessment tool the FPA score for 36 of the 40 examinations. One student used an LX-4000 and did not identify the auxiliary port to which the plethysmograph was connected. This resulted in a loss of vasomotor assessment tool data for four exams. In those cases, the experienced examiner scored the plethysmograph component visually. FPA scores were assigned with the standard ESS three-point scale, -1, 0, +1. The experienced examiner entered all scores into an Excel (Microsoft, 2013) spreadsheet and sent that spreadsheet to the school director (third author). The school director then sent the experienced examiner's scores and the individual testing and criterion assignment to the first author for analysis.

Results

Since the vasomotor responses in four examinations were scored using the Utah numerical scoring criteria rather than the newly developed vasomotor scoring tool, we ran an initial analysis to see if there were significant differences between total vasomotor scores generated by the tool and the Utah scoring. A Guilt (Guilty, Innocent) X Method (Utah, Tool) ANOVA of the total vasomotor scores produced no significant effects involving the Method variable. The main effect of Guilt was significant, $F(1, 36) = 9.88$, $p = .003$, $\eta_p^2 = 0.215$.

Numerical Scores

With 40 examinations, five question repetitions, and three relevant questions, there were 600 possible occasions to assign a numerical score in each of the components. The rate of assigning scores is shown in Table 1. Vasomotor response were scored the most and respiration responses the least

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(Continued on Page 39)

(Continued from Page 37)

Table 1 Frequency and Percentage of Scoring of the Various Components From the 600 Opportunities

Component	Frequency	Percentage Scored
Respiration	51	8.5%
Electrodermal	370	61.7%
Blood Pressure	390	65.0%
Vasomotor	447	74.5%

Means for the physiological components and total scores are shown in Table 2 for Innocent and Guilty subjects. Differences between guilty and innocent means, assessed with independent sample *t-tests* (*df* = 38) were significant for all of the components and the total score, $p < .01$. Component and total scores were correlated with each other and with the Guilt criterion. The correlation values are presented in Table 3. Component scores and the total score were all significantly correlated with the Guilt criterions and were ranked in predictive power as follows: electrodermal > vasomotor > blood pressure > respiration.

Table 2 Means and Standard Deviations for Component and Total Scores for Innocent and Guilty Subjects

Measure	Guilty	Innocent
Respiration	-1.85 (2.25)	0.00 (0.72)
Electrodermal Activity	-7.10 (6.54)	6.30 (7.52)
Mean Blood Pressure	-1.05 (3.28)	3.55 (3.71)
Vasomotor Activity	-1.80 (3.43)	3.65 (3.17)
Total ESS Score	-11.80 (7.69)	13.50 (9.30)

Table 3 Correlation of Component and Total Scores with Guilt

Measure	Respiration	Electrodermal	Blood Pressure	Vasomotor	Total
Electrodermal	0.41[b]				
Blood Pressure	0.25	0.37[a]			
Vasomotor	0.22	0.44[b]	0.35[a]		
Total	0.52[b]	0.91[b]	0.64[b]	0.68[b]	
Guilt	0.49[b]	0.70[b]	0.56[b]	0.65[b]	0.84[b]
[a] $p < .05$ [b] $p < .01$					

The component numerical scores were also submitted to a stepwise discriminant analysis. The discriminant analysis used the Wilk's method with the probability of entry set to 0.05 and the probability for removal set to 0.10. Three component scores were retained in the following order of stepwise entry, electrodermal, vasomotor, and blood pressure. The standardized canonical discriminant function coefficients were 0.685, 0.591, and 0.485, respectively. The canonical correlation was 0.831, and the *Wilk's Lambda* was 0.309, $p < 0.001$. The discriminant analysis also produced a decision classification table that is present here as Table 4. The initial discriminant model classified 95% of the cases correctly. A cross-validation of the classification performance was conducted using the N - 1 process whereby each case is classified by the functions derived from all cases other than that case. The classifications from the cross-validation analysis are also presented in Table 4. The cross-validation correctly classified 92.5% of the cases

Table 4 Original and Cross-Validated Discriminant Analysis Classifications

Analysis and Status	Predicted Group Membership	
Original	Deceptive	Truthful
Guilty	20	0
Innocent	2	18
Cross-validated		
Guilty	19	1
Innocent	2	18

ESS Decisions

Decisions with ESS were made with the standard -4 and +2 cutting scores. No adjustment in the cutting scores was made for the addition of the vasomotor component. ESS decisions made with and without the vasomotor component are shown in Table 5. Detection Efficiency Coefficients (Kircher, Horowitz, & Raskin, 1988) were calculated for ESS decisions with and without the vasomotor component. The Detection Efficiency Coefficient gives a single correlational value that assesses the classification power of deception detection. Without the vasomotor component the Detection Efficiency Coefficient was 0.86. With the vasomotor component the Detection Efficiency Coefficient was 0.87. The difference between these Detection Efficiency Coefficients was not significant.

Table 5 ESS Outcomes With and Without the Vasomotor Component

	Outcomes		
Without Vasomotor	Deceptive	Inconclusive	Truthful
Guilty	18	1	1
Innocent	1	2	17
With Vasomotor			
Guilty	18	1	1
Innocent	1	1	18

Discussion

The algorithm-based vasomotor assessment tool tested is more reliable than the human evaluators, and may be more precise, as are most computer scoring algorithms (Nelson, et al., 2008). Bell et al. (1999) reported the vasomotor response is scored about 30% of the time when using the

Utah Scoring System. In this study, the experienced examiner using the assessment tool entered scores for the vasomotor response in 74.5% of the cases. In this study the increased reliability and frequency of scoring produced a vasomotor measure that was strongly correlated with the Guilt criterion and one that outperformed the traditional respiration and blood pressure measures. Discriminant analyses of the component ESS scores produced a solution that included the vasomotor component as the second predictor and did not include respiration at all. It is notable that these results are very similar to those recently reported by Honts and Reavy (2015). Honts and Reavy found that their Utah Scoring System vasomotor component scores outperformed the blood pressure and respiration. Similarly, their discriminant analysis solution loaded the vasomotor component second and did not include respiration.

A possible flaw and limitation to this study was presented in the fact that four of the student examinations were collected using an LX 4000 instrument and the student examiner erred in not assigning the plethysmograph an auxiliary port status, resulting in a loss of the assessment plot/tool for those examinations. In place of the tool, an experienced examiner used the Utah numerical scoring criteria for FPA listed by Bell et al. (1999). However, our analysis failed to find any significant differences between the vasomotor scores generated with the Utah Scoring system and those scores generated with that assessment tool. Moreover, our results are very similar to those obtained by Honts and Reavy (2015) who used only the Utah Scoring System.

In this study the experienced examiner was familiar with the hardware and software of the assessment tool and recognized how artifacts might adversely affect the reaction ratio. When the experienced examiner noted artifacts in the pre or post-stimulus visual waveform, those data were excluded from consideration. If the unusable data were from a comparison question, the experienced examiner used the nearest comparison question that was without artifact. If the artifact was in a relevant question the experienced examiner scored it by assigning the value of zero. It is uncertain how well the assessment tool would work without training on data collection and artifacts. Additionally, it is not known how the repeated testing of individuals within this study affected the test data. Little work in test-retest reliability exists, though perhaps this scenario offers opportunity to fill in the knowledge gap. In this study serving as a subject in multiple tests seems to have had little impact on the accuracy of the examinations, as that accuracy was very high. Moreover, the results of this study were very similar to Honts and Reavy (2015) who used naive subjects recruited from the general community.

Finally, it is unknown how the inclusion of the vasomotor scores might affect the published reference distributions used to develop the ESS cutting scores. The ESS has published p-values for subtotal and grand total scores that were derived without the vasomotor component score. Since the ESS is being taught at many polygraph seminars and schools it would be important to know if, and how, these plethysmograph scores affect the distributions. We made no adjustments here and achieved high performance, but the generalizability of our findings should be established through replication with other subject populations.

One additional finding in this study is worth noting. Honts and Handler (2014) addressed the issue of numerically evaluating respiration in directed-lie tests. They reviewed the literature and concluded that the available data supported scoring respiration as normal when directed-lie comparison questions were used. This study employed directed lies and significant correlations with the guilt criterion were obtained with the ESS scores from the respiration component that was scored with the standard ESS rules. While the stepwise discriminant model did not include respiration, this should not be taken as an indication that respiration should not be evaluated. The lack of inclusion of respiration in the stepwise discriminant analysis indicates that after the other three variables were entered, respiration did not significantly improve the accuracy of the model. The original model was already classifying 95% of the subjects correctly. Thus the ability of the statistical model to improve more was limited by approaching the ceiling on accuracy. Respiration produced a significant and substantial correlation with the guilt criterion of 0.49. That correlation is a strong indication that respiration is a valuable measure for scoring. Thus, these results pro-

vide additional evidence to support the Honts & Handler's (2014) recommendation that the respiration component be scored as normal with the Utah or the ESS criteria and rules.

Conclusion

The results of this study provide general support for the effectiveness of the algorithm-based assessment tool we tested. The vasomotor scores derived using the assessment tool strongly correlated with the Guilt criterion and outperformed the traditional blood pressure and respiration components. These results are consistent with the large body of research supporting the use of the vasomotor response for deception detection. In total this body of scientific studies provides strong support for the use of the vasomotor response in field application.

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Appendix A.

Instructions, Innocent Condition

By now you have agreed to be a participant in this study.

There are different conditions in this study. These instructions will tell you about your role in the experiment.

Your condition assignment was made on a random basis, and you actually chose it with the envelope you selected.

None of the polygraph examiners know whether you will be telling the truth during the polygraph examinations. Do not tell them!

You have been selected to be in the innocent condition.

Please read these instructions carefully and make sure that you understand exactly what you are to do. Reread these instructions if necessary. You may make a few notes to help you remember what to do as you carry out these instructions - there are writing materials on the desk for you.
This is a polygraph, or psychophysiological detection of deception experiment. About half of the subjects in the experiment are instructed to commit a theft. They are to go to a room and steal some money from an envelope. Then they report back for a polygraph examination. If they are found innocent on the test, they are placed in a pool for a considerable bonus on their final examination grade - in addition to earning required class credit during their participation in the experiment.

You are not one of those subjects. You are not to steal anything. Your mission, if you choose to accept it, will be to drop off an envelope (located in this packet) in the staff mailbox slot labeled "Pallante" inside the door of the Academy Personnel Office (along the hallway leading to the cafeteria) in the Ohio State Highway Patrol Academy Building.

You are an innocent suspect. But you too can receive a chance for the bonus by being found innocent on the polygraph examination. The bonus, in addition to the class credit you will receive for participating in this experiment, is ten points added to your final examination grade. The innocent student scoring the highest truthful average scores will receive ten extra points added to their final examination grade. Therefore, it is in your best interest to be truthful during the test and deny having anything to do with the theft of the money. It is also in your best interest to produce truthful charts without attempting to defeat or distort the test in any manner.

Two experienced polygraph examiners will scrutinize each examination, looking for evidence of countermeasure activity. Any examination deemed suspicious by the evaluators *will result in a loss of twenty points from the final examination grade of the test subject*. So while it is in your best interest to appear truthful and pass the test, you are highly discouraged from cheating while acting as a test subject. Acts of cheating will be dealt with as violations of the school's honor code - this includes revealing your status to any other student or instructor until allowed to do so.
Before you leave this room, check the time. You have 5 minutes to complete this task. Do not return early. If you finish early, wait until the 5 minutes are up, and then return to the room you are in now, and wait until someone comes for you.

You will be given a series of tests by fellow student polygraph examiners. The examiners will not know if you are innocent or guilty of the theft, which is why you will be treated as though you are a suspect. This is so that the decision can be made entirely on the results of the polygraph test. Remember, you will be in the OSHP Academy Building delivering an envelope to the staff mailbox slot labeled "Pallante, but you won't see money or steal anything. You could easily give yourself away by accidentally revealing any other details, so please maintain your innocence wisely. *Remember that revealing your status before completion of the project will ruin the project, disqualify you and possibly result in disciplinary action for violating the honor code.*

You will be eligible to receive the bonus only if the examiner finds you innocent and your average score is the highest truthful score. So you must actually convince the examiner and evaluator of your innocence. If either the examiner or evaluator decides that you are deceptive (or cannot determine whether you are deceptive or innocent) you will not be eligible to receive the bonus.
Those are your instructions. You must follow those instructions exactly to be eligible for the bonus and to receive credit for participation. If you do not wish to participate in this experiment, please inform the school director and you will be assigned an equivalent amount of practical work over the weekend before graduation. If you are not entirely sure of what to do, reread the instructions.

Tear up the written script you are reading now and dispose of it in the trashcan in this room before you leave.

Once you leave this room, you should return in exactly 5 minutes, not sooner, and not later. That is it. Good luck with the examinations.

Appendix B.

Instructions Guilty Condition

By now you have agreed to be a participant in this study.

There are different conditions in this study and these instructions will tell you about your role in the experiment.

Your condition assignment was made on a random basis, and you actually chose it with the envelope you selected.

None of the polygraph examiners know whether you will be telling the truth on the polygraph examination.

You have been selected to be in the deceptive condition.

Please read to these instructions carefully and make sure that you understand exactly what you are to do. Reread these instructions if necessary. You may make a few notes to help you remember what to do as you carry out these instructions. There are writing materials on the desk for you.

This is a polygraph, or psychophysiological detection of deception experiment. Because you are in the deceptive condition, you will steal an envelope containing money from the Ohio State Highway Patrol Academy Building. You will then be given a series of polygraph examinations. If you can "beat the polygraphs" by appearing innocent on that tests, you will be eligible for a substantial bonus in the form of points added to your final examination grade. Also you will receive the required credit towards your graduation for participating in the experiment.

Your mission, if you choose to accept it, is as follows: You will go to the Academy Personnel Office (along the hallway leading to the cafeteria) of the OSHP Academy Building and remove the envelope from the mailbox labeled "Pallante". That envelope is addressed to Sam Stone. You will verify its contents. Take the contents out of the envelope and conceal it on your person. You can hide it in your wallet or in any of your pockets, but do not put it in your shoe or in your sock. Tear the envelope up and dispose of it in any trashcan. If you are found Innocent on the polygraph examination, you will be placed in the running for ten extra points added to your final examination score. The guilty student who produces the highest average truthful score will receive an extra ten points on his or her final examination grade.

WARNING- Two experienced polygraph examiners will scrutinize each examination, look-ing for evidence of countermeasure activity. Any examination deemed suspicious by the evaluators *will result in a loss of twenty points from the final examination grade of the test subject*. So while it is in your best interest to appear truthful and pass the test, you are highly discouraged from cheating while acting as a test subject. Acts of cheating will be dealt with as violations of the school's honor code. *This includes revealing your status to any other student or instructor until allowed to do so.*

You must return the money from the envelope when the polygraph experiment is completed, only after you are told to do so. Be careful not to leave any fingerprints, and be sure to dispose of the envelope where it will not be found. It is extremely important that you steal the money without alerting anyone to the theft. For example, since the Academy Personnel Office is a faculty office area, be sure to have your alibi ready in case someone asks you what you are doing.

You are not, and I repeat, not to tell anyone that you are participating in an experiment. YOU DO NOT WANT TO GET CAUGHT COMMITTING THIS CRIME so be prepared to do this mission in a discrete fashion. If you do get caught please call Pam Shaw or Mike Gougler immediately. None of the academy staff knows we are conducting this experiment and any theft discovered may appear real.

Before you leave this room, check the time. You have 5 minutes to complete your theft once you leave. Do not return early. If you finish early, wait until the 5 minutes are up, and then return to the room you are in now, and wait until someone comes for you.

You will be given a number of examinations by student polygraph examiners. The examiners will be testing you about the theft of the missing money, and he or she will not know if you are innocent or guilty of the theft because about half of the subjects in the experiment have not committed the theft. This is so that the decision can be made entirely on the results of the polygraph test. Do not make the examiner suspicious when he or she is interviewing you during the initial portion of

the test. Your alibi is to tell the examiner you were in the OSHP Building delivering an envelope to Pallante's mailbox, but that you never saw money or stole anything. You could easily give yourself away by accidentally revealing any other details, so please maintain your innocence wisely.

So, when the polygraph examiners ask you questions or details about the theft, you must not only deny knowing anything other than that, but you must do so sincerely so that he or she does not become suspicious. If at some point during the test you think you blew it, do not give up.

You will receive the bonus only if the evaluating examiner finds you innocent and you have the top truthful scores from the guilty group. So you must actually convince the examiner that you are innocent. If the examiner decides that you are deceptive (or cannot determine whether you are deceptive or innocent) you will not be eligible to receive the bonus.

Those are your instructions. You must follow those instructions exactly to be eligible for the bonus points. If you do not wish to participate in this experiment, please inform Pam Shaw. She will arrange alternative course time over the weekend before graduation to make up for not participating in this study. If you are not entirely sure of what you are to do, reread the instructions until you are sure.

Tear up the written script you are reading now and dispose of it in the trashcan in this room before you leave.

Once you leave this room, you should return in exactly 5 minutes, not sooner, and not later. That is it. Good luck with the examination.

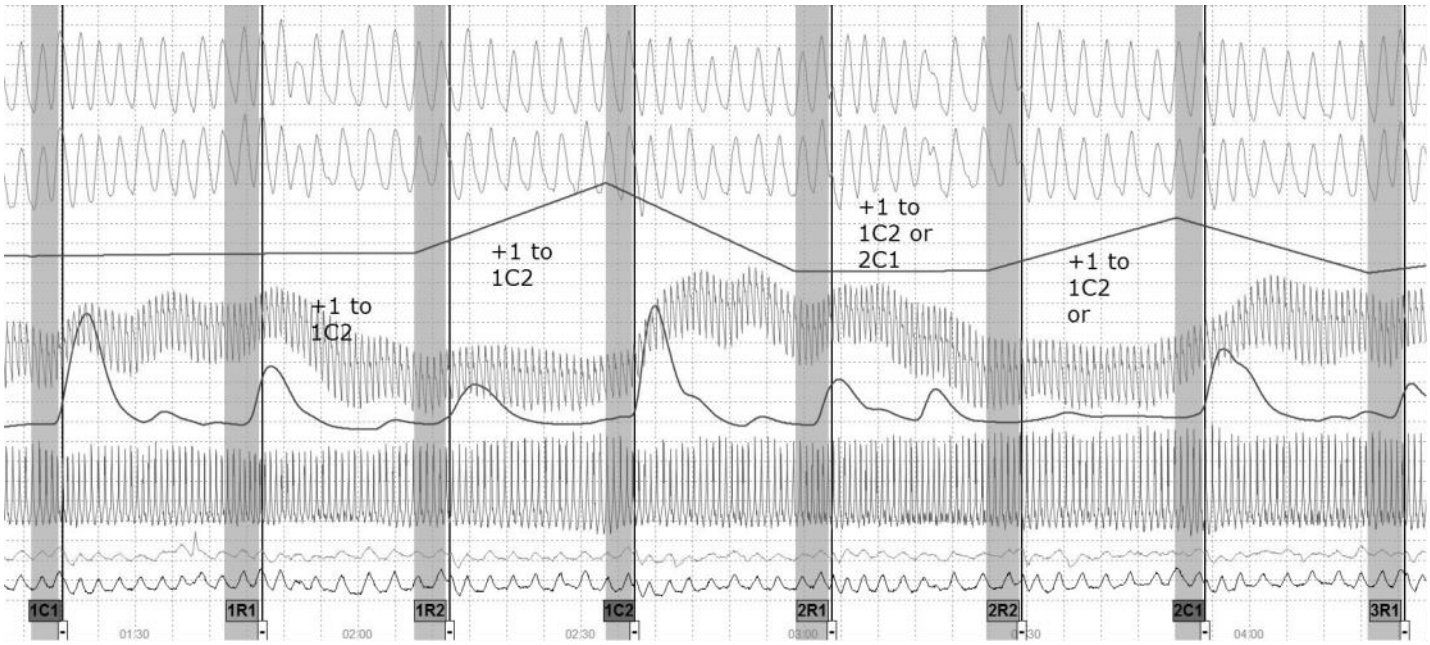
Appendix C

Polygraph Test Questions

1. Do you understand I will ask you only the questions we reviewed?
2. Regarding the money that was taken, do you intend to answer each question truthfully?
3. Is this the year 2014?
4. Before this year, did you ever take something that didn't belong to you?
5. Did you take that money?
6. Are you now physically located in the state of Ohio?
7. Before this year, did you ever do something dishonest or illegal?
8. Did you take that money from that office?
9. Is this the month of December?
10. Before this year, did you ever deceive someone?
11. Do you know where that money is now?

Appendix D

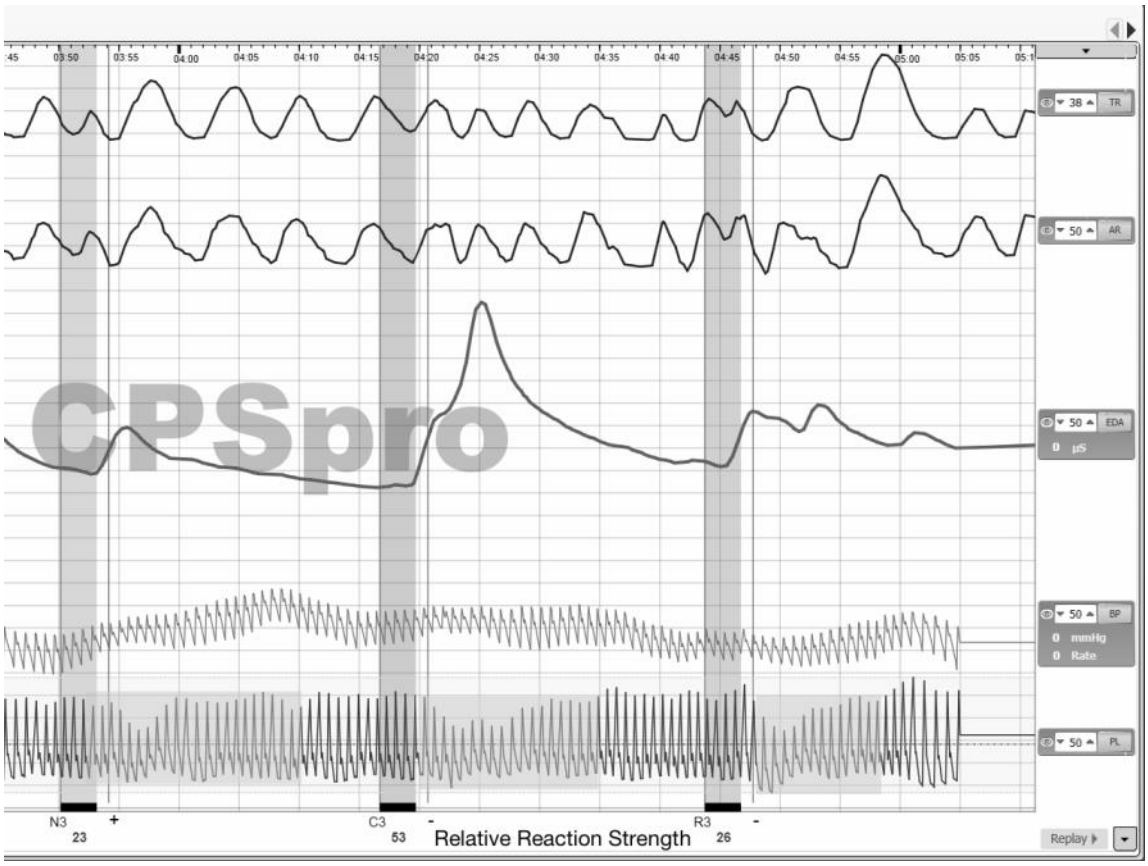
Lafayette Instrument Vasomotor Assessment Tool Example

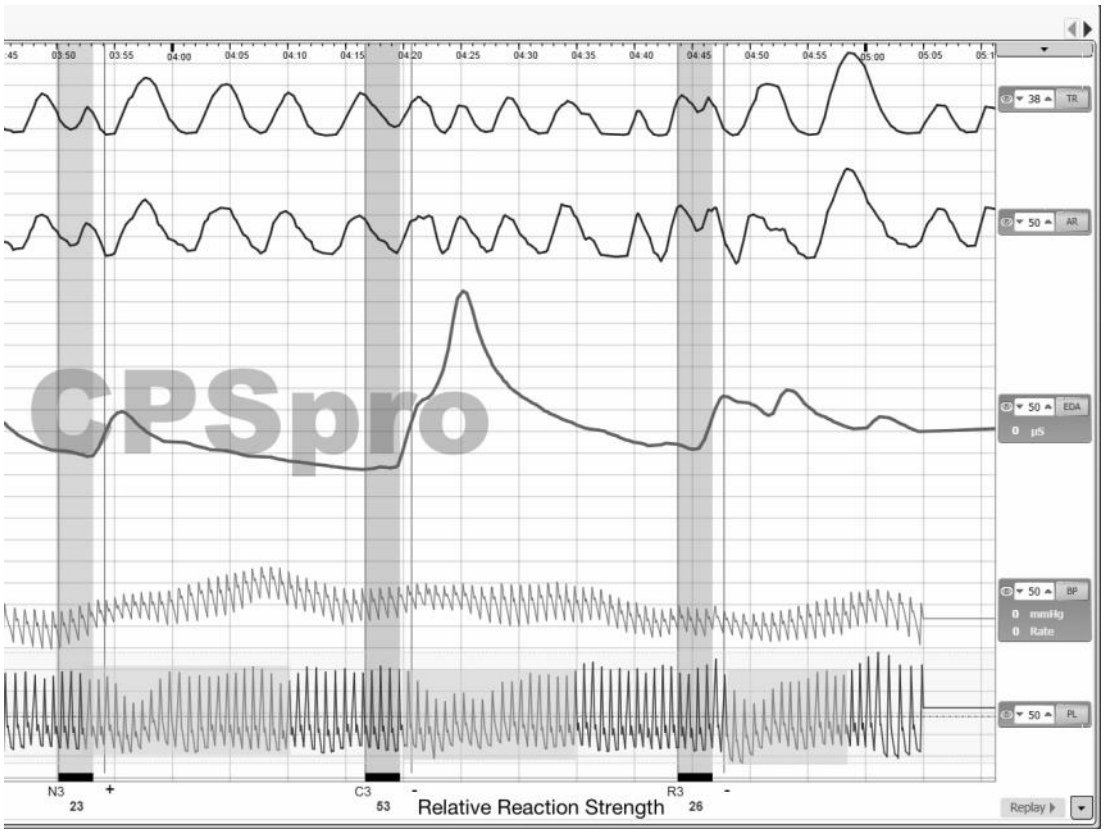


When using the Lafayette Instrument Company software LXSoftware 11.4 or greater a "virtual trace" default-labeled PA can be plotted upon completion of the test chart. Using average amplitude for pre and post stimulus times described above, the software plots a relative reaction ratio point at the beginning of each stimulus. The reaction ratio is calculated by dividing the post stimulus data by the pre stimulus data and plotting the ratio so the higher of two points reflects a relative greater degree of pulse amplitude suppression, or greater reaction. The points are connected by lines to allow the reviewer to assess differences in height. In the above example the plotted point for 2R1 is lower than either of the comparative points at 1C2 or 2C1 so there was greater reaction at the comparison questions. The scores for each relevant question and the rationale are written in for convenience. PLE scores in ESS are either 0, +1, or -1.

Appendix E

Stoelting CPSPro Fusion Scoring Screen





When numerically scoring in CPSPro Fusion clicking in the scoring matrix or on a component will highlight (in yellow on a color screen, here shown in grey) the scorable area in the tracing. The highlighted tracing represents the scorable area according to the University of Utah Scoring System Criteria. The CPSPro Fusion manual (Stoelting, 2011) provides the following description for the vasomotor response, "Plethysmograph: the magnitude and duration of decreases in the amplitude of finger pulses that began a minimum of two seconds after the question onset." (p. 121) The numbers shown along the bottom are relative strength of reaction for that component. The manual describes those numbers, "These measurements indicate the relative strength of the reactions ranging from 0 (smallest reaction on the chart) to 99 (largest reaction on the chart)." (p. 120). Larger numbers thus indicate larger responses with regard to the University of Utah criteria. In the image above the vasomotor response to C3 has a value of 53 while the response to R3 has a value of 26. Thus the response to C3 is slightly more than twice the size of the response to R3. A positive numerical score would be assigned at this spot. In the University of Utah Scoring system this vasomotor comparison would be scored as a +2.

Any information or claims reported in any articles or advertisements do not necessarily represent the views or opinions of the Officers or Board of Directors of the AAPP and members should evaluate any information based on current peer reviewed studies and research.

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Journal: The AAPP Journal, *"THE POLICE POLYGRAPHIST,"* is published three times per year and includes timely and relevant news, articles and information regarding the business and activities of the AAPP. It also includes reports from the five regional directors regarding activities of state organizations and associations. The regional reports highlight state association sponsored seminars and meeting, state legislative issues and other news from the regions. The Journal also includes a section featuring the AAPP approved schools and their respective training schedules.

Digest/Newsletter: The first AAPP newsletter, *"THE POLICE POLYGRAPH DIGEST,"* made its debut in January 2007. The Digest features pertinent polygraph articles from our members and additional relevant information that is normally not featured in the Journal. Advertisers are invited to place their ads in our popular and informative AAPP Digest, which is the first publication of the calendar year and is included in the optional quarterly or yearly pricing.

Directory on CD: The AAPP's *"Directory of Members,"* is an on-line publication that is maintained throughout the year and is available to all members in the Member's only section of the AAPP website. It is available for viewing on-line or can be downloaded and used a handy reference on schools, fellow members and advertisers. The cost for advertising in the AAPP on-line directory is $500.00 per year.

All advertisements to be placed in the AAPP *"THE POLICE POLYGRAPHIST,'* or the *"POLICE POLYGRAPH DIGEST,"* need to be received by the AAPP Editor 45 days prior to the proposed publication dates?

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DEADLINES AND PUBLICATION DATES:
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Sept. 16 deadline for the **November Journal Issue**

For more information contact:
AAPP National Office Manager
Amanda Reece
3223 Lake Ave, Unit 15c-168
Wilmette, IL 60091-1069
847-635-3980
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American Association of Police Polygraphists, Inc.

MEMBERSHIP APPLICATION

visit our web site: www.policepolygraph.org

Answer all sections completely. Incomplete or false statements will be grounds for disqualification and/or removal from membership. *Please type or print clearly.*

CLASS OF MEMBERSHIP

CHECK ONE:

☐ **ACTIVE:** Must be a law enforcement polygraphist as defined in Article III. The applicant must have demonstrated proficiency in the administration of polygraph examinations.

☐ **INTERN:** A law enforcement polygraphist as defined in Article III, who has completed the classroom portion of an AAPP-recognized school, but has not completed an internship. No sooner than six months after successful completion of an AAPP-recognized polygraph school and successful completion of a minimum of 50 polygraph exams, an Intern member may apply for Active membership.

☐ **AFFILIATE MEMBERSHIP:** Granted to persons who demonstrate a genuine interest in the polygraph profession.

FIRST NAME:	MI:	LAST NAME:	DOB:
MAILING ADDRESS:			
CITY:	ST:	ZIP: -	WORK: ( ) -	CELL: ( ) -
FAX: -	HOME: ( ) -	EMAIL:	
ARE YOU A UNITED STATES CITIZEN? ☐ YES ☐ NO			
DOES YOUR STATE HAVE POLYGRAPH LICENSING? ☐ YES ☐ NO (IF YES) ARE YOU CURRENTLY LICENSED IN YOUR STATE? ☐ YES ☐ NO			
LICENSE #	LIST ALL POLYGRAPH LICENSES YOU HAVE HELD:		

POLYGRAPH TRAINING

SCHOOL NAME:	
GRADUATION DATE:	INTERN SUPERVISOR:
SCHOOL DIRECTOR:	PHONE:

(If this school is not currently active, please provide a copy of your graduation certificate and detailed information about the school on a separate sheet)

LAW ENFORCEMENT POLYGRAPH EXPERIENCE

HOW MANY YEARS OF EXPERIENCE?	NUMBER OF LAW ENFORCEMENT EXAMS CONDUCTED?
WHAT PERCENTAGE OF YOUR WORK TIME IS DEVOTED TO POLYGRAPH? %	
INSTRUMENT AND TECHNIQUE(S) CURRENTLY USING:	
LIST ANYCURRENT OR PAST POLYGRAPH ASSOCIATION(S) IN WHICH YOU ARE (WERE) A MEMBER OR TO WHICH YOU HAVE APPLIED:	
HAVE YOU EVER BEEN DENIED MEMBERSHIP INTO ANY POLYGRAPH ASSOCIATION? ☐ YES ☐ NO ***(Provide detailed information on a separate sheet of paper if you answered YES to this question)***	

CURRENT EMPLOYER

AGENCY/COMPANY NAME:	PHONE:
ADDRESS:	
SUPERVISOR:	PHONE:
YOUR DUTIES:	

(If not currently employed by a law enforcement/governmental agency, please list any former law enforcement /governmental agency employment on page 2)

FORMER LAW ENFORCEMENT EMPLOYMENT

AGENCY NAME:	PHONE: ( ) -
ADDRESS:	
SUPERVISOR:	PHONE: ( ) -
HIRE DATE: / / *(Check ONE)* RETIRED, RESIGNED, TERMINATED DATE:	
DID YOU CONDUCT POLYGRAPH EXAMINATIONS WHILE EMPLOYED BY THIS AGENCY? ☐ YES ☐ NO	

If you were/are not a full-time salaried law enforcement or governmental agency employee, please list a law enforcement/governmental agency for which you provide polygraph services:

AGENCY NAME:	PHONE: ( ) -
ADDRESS:	
CONTACT:	PHONE: ( ) -

PERSONAL HISTORY

(1) Have you ever been convicted of a crime? ☐ YES ☐ NO (2) Have you ever been discharged or released from any branch, department or agency of federal, state, county or municipal government, including the armed services of the United States of America and it's Reserve or National Guard affiliates under other than honorable conditions? ☐ YES ☐ NO (3) Have you ever been discharged or asked to resign from any employment, organizational membership or society? ☐ YES ☐ NO

(Provide detailed information on a separate sheet of paper if you answered YES to any of these questions)

CHARACTER REFERENCES MUST BE POLYGRAPHISTS

NAME	AGENCY	PHONE #	E-MAIL

APPLICATION AGREEMENT

I hereby apply for membership, pursuant and subject to the Constitution and By-laws of the American Association of Police Polygraphists, Inc. (hereafter referred to as the AAPP). I further agree to be bound to the AAPP's Constitution and By-laws. I agree to hold the AAPP, its officers and agents and anyone acting on its behalf free from damage, liabilities or complaint by any action taken in connection with this background or information obtained to determine membership. I hereby request and authorize any and all persons, agencies, firms, companies, educational institutions, courts, law enforcement or government agencies, having information or documents related to or about me, to furnish such information and/or documents to an authorized representative of the AAPP. **Enclosed is $150.00 - U.S. currency ($175.00 for foreign members). I understand that $125.00 ($150 for foreign members) represents a one-year membership fee, and $25.00 is a non-refundable AAPP filing and administrative fee.** I further grant permission to the president of the AAPP, or a designated representative, to release any and all information that the AAPP has learned while conducting a background relative to this application or information concerning my membership. Such information may be released to any national, regional or state polygraph association making such request. The information I have provided on this application is true and accurate. **MAIL completed application with payment (check or money order payable to *American Association of Police Polygraphists, Inc.*) to AAPP National Office, 3223 Lake Ave., Unit 15c-168, Wilmette, IL 60091-1069 or EMAIL completed application (in Word or PDF format) to nom@policepolygraph.org and pay by credit card by calling 1-847-635-3980. Please call the AAPP National Office if you have any questions.**

APPLICANT'S SIGNATURE:_____ DATE: _____

OFFICE USE ONLY

APPLICATION APPROVED:_____ NOT APPROVED:_____ MEMBERSHIP NUMBER: _____

REGIONAL DIRECTOR SIGNATURE:_____ DATE: _____

APPP 2015

American Association of Police Polygraphists, Inc.

WILLIAM "BUDDY" SENTNER SCHOLARSHIP AWARD *

SCHOLARSHIP APPLICATION

The American Association of Police Polygraphists, Inc. sponsors an annual educational scholarship to any deserving and qualified graduating high school senior or student currently attending college. Each applicant must complete the following application for eligibility. Incomplete applications will not be considered.

The American Association of Police Polygraphists (AAPP) may award scholarship(s) annually. AAPP Scholarship Selection Committee members consist of the current Officers and Board of Directors of the Association. The Selection Committee is presided over by the Chairperson of the Board or a designee. The Selection Committee determines the monetary amount awarded on an annual basis for this scholarship program. If the submitting applicant is a dependent of a Selection Committee member, said member will not act in the selection process.

The submitting applicant must be a child, grandchild, niece, nephew, or adopted or dependent child, or spouse. The applicant must have at least one parent, grandparent, uncle, aunt or legal guardian or spouse who is a FULL, LIFE, or HONORABLY RETIRED member in good standing with the AAPP. The applicant's relative may be deceased as long as he or she was a member in good standing with the AAPP at the time of death.

Requests for applications will be made to the AAPP Chairperson and the AAPP Board of Directors. Applications must be completed and returned to the chairperson no later than February 15th of the year in which the applicant applies. The chairperson will present all completed applications to the Selection Committee for evaluation during the AAPP's scheduled board meeting prior to the annual business meeting. Recipient(s) of the scholarship will be announced during the annual seminar meeting; recipient(s) name and photograph may be published (unless specifically requested not to) in the *AAPP Journal.*

The Selection Committee must approve any deviation or changes required as part of this program. Requests for any changes must be submitted in writing to the chairperson. The Selection Committee will make all decisions regarding the rules and information of the scholarship application. All applications are to be evaluated in the same manner. Decisions about the amount of the award; disbursement of scholarship monies; and, selection of recipients will be made by the Selection Committee. The chairperson will notify the recipient of the scholarship award, and the AAPP Treasurer will ensure proper disbursement of monies to the recipient(s) or to the recipient's school.

THE FOLLOWING INFORMATION MUST BE PRINTED OR TYPED. ANY INFORMATION NOT INCLUDED OR ILLEGIBLE WILL BE CAUSE FOR APPLICATION REJECTION.

APPLICANT NAME AND ADDRESS

FIRST NAME: _____ MI: ____ LAST NAME:_____

MAILING ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

WORK PHONE: ( ) _____ HOME PHONE: ( )_____

FAX NO. ( ) _____ EMAIL: _____

AAPP MEMBER INFORMATION

FIRST NAME: _____ MI: ____ LAST NAME:_____

RELATIONSHIP:_____ ☐ LIVING ☐ DECEASED

SCHOOL INFORMATION

LIST THE COLLEGE, INSTITUTION OR UNIVERSITY YOU PLAN TO ATTEND.

_____

_____

ACCEPTED: ☐ **YES** ☐ **NO** WHICH SCHOOL(S)_____

HAVE YOU APPLIED FOR FINANCIAL AID AT THE COLLEGE, INSTITUTION OR UNIVERSITY LISTED ABOVE? ☐ **YES** ☐ **NO**

ARE YOU THE RECIPIENT OF ANY OTHER SCHOLARSHIP AWARD? IF YES, PLEASE DESCRIBE: _____

_____

ESTIMATE FINANCIAL ASSISTANCE NEEDED PER YEAR: _____

PLEASE DESCRIBE YOUR EDUCATIONAL GOALS: _____

_____

_____

PERSONAL HISTORY

(1) Have you ever been the subject of a criminal investigation or an offense involving moral turpitude? ☐ **YES** ☐ **NO** (2) Have you ever been discharged or released from any branch, department or agency of federal, state, county or municipal government, including the armed services of the United States of America and it's Reserve or National Guard affiliates for reasons other than honorable conditions? ☐ **YES** ☐ **NO** (3) Have you ever been discharged or asked to resign from any employment, organizational membership or society? ☐ **YES** ☐ **NO**

(*Provide detailed information on a separate sheet of paper if you answered YES to any of these questions)*

ARE YOU PRESENTLY EMPLOYED: ☐ FULL TIME ☐ PART TIME

LIST EMPLOYER (S): _____

_____

ARE ANY MEMBERS OF YOUR FAMILY ATTENDING COLLEGE NOW? IF YES, GIVE PARTICULARS: _____

_____

LIST ANY SPECIAL RECOGNITION YOU MAY HAVE RECEIVED FOR EXCELLENCE IN SCHOOL WORK, SUCH AS PRIZES, AWARDS OR HONORS:

_____

_____

_____

LIST ACTIVITIES AND/OR ANY OFFICES OR POSITIONS HELD: _____

_____

_____

LIST YOUR EXTRA CURRICULAR OR COMMUNITY ACTIVITIES AND HOBBIES:

_____

_____

_____

IN THE SPACE BELOW IN **YOUR HANDWRITING** ***(DO NOT TYPE)*** STATE YOUR GOALS AND OBJECTIVES FOR THE FUTURE.

ADDITIONAL INSTRUCTIONS

1) Applicant must submit with this application an official transcript of all courses and grades received throughout high school and/or other educational institution most recently attended.

2) Applicant must provide with this application two character reference letters, one from your current institution's faculty and one from a non-relative.

3) If extra space is needed, the applicant may include *(by enclosure or attachment)* additional pages to this application. All information will be retained by the AAPP and will not be returned to the submitting applicant.

APPLICATION AGREEMENT

YOU ARE REQUIRED TO SIGN AND DATE YOUR APPLICATION. FALSIFICATION OR OMISSION OF INFORMATION WILL RESULT IN REJECTION OF THE APPLICATION. NOTE: YOUR SIGNATURE AUTHORIZES THE **AAPP** TO REQUEST AND VERIFY ANY BACKGROUND INFORMATION REGARDING YOUR APPLICATION.

APPLICANT'S SIGNATURE: _____ DATE: _____

WITNESS' SIGNATURE: _____ DATE: _____

PLEASE SUBMIT COMPLETED APPLICATION TO:

AAPP

3223 Lake Ave., Unit 15c-168, Wilmette, IL 6009-1069

BUSINESS PHONE: (847) 635-3980

EMAIL ADDRESS: nom@policepolygraph.org

* WHO IS WILLIAM "BUDDY" SENTNER

Special Agent Buddy Sentner, a 44 year old AAPP member, was shot and killed in the Tallahassee Federal Correctional Institution while serving arrest warrants on six federal corrections officers on June 21st, 2006. The officers had been charged with smuggling contraband to prisoners in exchange for money and other favors. As agents served the warrants in the lobby, one of the six corrections officers opened fire with a weapon he had smuggled into the prison. Agent Sentner returned fire while he shielded the other agents in the room from the gunfire. Before he was fatally shot in the chest, Agent Sentner's shots fatally wounded the assailant. A corrections lieutenant, who assisted the agents serve the warrants and make the arrests, was also shot and wounded by the assailant. The other five corrections officers were taken into custody. Agent Sentner had served in law enforcement for 17 years. He was assigned to the U.S. Department of Justice - Office of the Inspector General, Orlando Field Office. He had formerly served as a special agent with the United States Secret Service and as an officer with the United States Secret Service Uniformed Division.

American Association of Police Polygraphists, Inc. (AAPP)

Application for Review and Designation as: Certified Forensic Law Enforcement Examiner

REQUIREMENTS:

1. Active or Life Member in good standing of the American Association of Police Polygraphists.
2. Graduation from a formal Polygraph training school recognized and approved by the Board of Directors of the American Association of Police Polygraphists.
3. Completion of a supervised polygraph program by an experienced polygraph examiner, commonly referred to as an internship whether formal or informal.
4. Completion of a minimum of two hundred (200) polygraph exams.
5. Currently active in the supervision or administration of polygraph examinations.
6. Completion of twelve (12) hours annually of continuing professional education in polygraph technique and instrumentation approved by the Board of Directors the American Association of Police Polygraphists, to include attendance at a minimum of one (1) AAPP seminar during the past three (3) years. Certification will be valid for a period of three (3) years from the date of the last AAPP Annual Seminar attended. I understand that I must re-apply for certification when my certification expires.

I certify that I possess the qualifications listed above for certification and hereby make application for same. I understand that by accepting certification I agree to comply fully with the Law Enforcement Polygraph Standards and Principals as set forth by the American Association of Police Polygraphists. I understand that any false statement or representation on my part associated with this application for certification will be sufficient cause for the revocation of certification.

SIGNATURE _____

PRINT NAME _____
First Middle Last

MAILING ADDRESS: _____
Street Address or P. O. Box

_____
Additional Line for Address

_____
City, State, Zip Code

TELEPHONE:_____ EMAIL: _____

Note: The $25.00 processing fee must accompany application. Make check payable to AAPP.

CERT#1 R11/05

American Association of Police Polygraphists, Inc. (AAPP)

Supporting Documents to Accompany APPLICATION FOR CERTIFICATION

Print name: _____ AAPP No. _____
First *Middle Initial* *Last*

Name of polygraph school: _____ Graduation Date: _____

Name of your Intern Sponsor: _____

Intern sponsor's telephone: (_____) _____ Date internship completed: _____

Number of polygraph examinations conducted: _____

Total number of continuing education hours completed in the last three (3) years: _____

The last AAPP Conference I attended took place in _____ on _____
(Please attach copies of continued professional education) *Location* *Date*

Please attach photocopies of "Continuing Education" Training Certificates for the last three (3) years.

This detailed information sheet must accompany the application for certification. If sufficient requirements have not been completed during the present calendar year you may use the previous three (3) calendar years for consideration. The information contained must be verifiable upon request. You are notified that verification will be requested on a random basis or at the specific request of any member of the American Association of Police Polygraphists (AAPP).

Send completed application along with the $25.00 processing fee to:

Bob Heard – Polygraph Detail
SBSD – Headquarters
655 E. Third St
San Bernardino, CA 92415

CERT#2 R11/05

AMERICAN ASSOCIATION OF POLICE POLYGRAPHISTS, INC.

CHANGE NOTICE TO UPDATE AAPP DIRECTORY

PLEASE CHECK THE AAPP DIRECTORY TO ENSURE THAT YOUR ADDRESS AND RELATED INFORMATION ARE CORRECT. ALL ANNOUNCEMENTS (SEMINAR, DUES INVOICES AND THE JOURNAL) ARE SENT TO THE ADDRESS LISTED. IF THE INFORMATION IS INCORRECT, PLEASE COMPLETE THIS FORM AND FORWARD IT AS LISTED BELOW.

NAME AND ADDRESS

FIRST NAME: _____ MI: _____ LAST NAME: _____

MAILING ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____ WK PHONE: ( )_____

FAX: ( )_____ HOME PHONE: ( )_____ EMAIL: _____

CLASS OF MEMBERSHIP

CHECK ONE:

- ❑ ACTIVE: Must be a law enforcement polygraphist as defined in Article III. The applicant must have demonstrated proficiency in the administration of polygraph examinations.
- ❑ INTERN: A Law Enforcement Polygraphists as defined in Article III, who has completed the classroom portion of an AAPP recognized school but has not completed an internship. No sooner than six months after successful completion of an AAPP recognized polygraph school and successful completion of a minimum of 50 polygraph exams, an Intern member may apply for Active membership.
- ❑ AFFILIATE MEMBERSHIP: Granted to persons who demonstrate a genuine interest in the polygraph profession.

POLYGRAPH TRAINING

SCHOOL NAME: _____

STATE LICENSE NO.: _____

CURRENT EMPLOYER

AGENCY/COMPANY NAME: _____ PHONE: ( ) _____

FAX, SEND OR E-MAIL TO:

AAPP National Office
P.O. Box 657
Waynesville, Ohio 45068-0657
FAX: 937-488-1046
E-MAIL: aappnom@hughes.net

Call AAPP toll free at 1-888-743-5479 with any questions.

AAPP Membership Cancellation

Advisement

To: AAPP Secretary

I, _____, have terminated my membership with the American Association of Police Polygraphists (AAPP).

- I am returning the AAPP membership certificate bearing my name and membership number to the address listed below, or,
- I have destroyed the AAPP membership certificate bearing my name and membership number.

I have removed any claim(s) of membership to the AAPP from my advertisement, to include but not limited to, my business cards, letterhead, and web page(s).

_____ _____

Signature Date

Bob Heard, AAPP Secretary

PO Box 552

Yucaipa, CA 92399-0552

Please direct any questions to Bob at: aappsecretary@aol.com

The AAPP thanks you.