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Page	Contents

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An Associate Editor will handle papers, and the author may, at the discretion of the Associate Editor, communicate directly with him or her. For all submissions, every effort will be made to provide the author a review within four weeks of receipt of manuscript. Articles submitted for publication are evaluated according to several criteria including significance of the contribution to the polygraph field, clarity, accuracy, and consistency.

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Correlation Study of Brachial and Forearm Cardiograph Sensors

Raymond Nelson
Rodolfo Prado

Abstract

Alternative solutions have been suggested to the traditional brachial arm cuff used in polygraphic credibility assessment testing to reduce the vulnerability of the cardiograph sensor data to artifacts that may disrupt the usability of the data, and to reduce level of physical discomfort that may be experienced and reported by polygraph examinees. This study involved the collection of simultaneous time-series recordings of the cardiograph data used in polygraphic credibility assessment testing. Data were obtained using a common form of acquaintance or practice test. Correlations were calculated for two alternative locations for the deployment or attachment of the cardiograph sensor to the examinee. Replacement of recording sensor technology supported by decades of validity research, published statistical models, and exhaustive field experience is a complex task. An ideal solution will be a replacement sensor solution in the form of a drop-in replacement that provides a very high correlation with the replaced sensor when data are of normal, un-artifacted, interpretable quality, while increasing the number of cases for which the cardiograph sensor data remain usable. Results from this study suggest that two alternative cardiograph sensor deployment solutions, leg-cuff and forearm-cuff, may be suitable for drop-in use, and may provide some advantages in terms of improved data quality. However, concerns about potentially serious medical events such as a dislodged thrombosis, regardless of how rare or unlikely its occurrence, should preclude further interest in the use of the leg cuff deployment. Continued interest in the forearm cuff deployment is recommended.

Introduction

Scientific credibility assessment testing – often referred to as polygraph testing, and commonly referred to as lie-detection testing – does not detect or measure lies *per se*, and instead relies on proxy signals to make probabilistic conclusions. In this way, credibility assessment testing, is like other scientific tests that use statistical methods to quantify phenomena that cannot be subject to perfect deterministic observation or direct physical measurement – because they are very tiny, very far away, unobservable due to the passage of time, or simply amorphous.

The traditional array of polygraph sensors was developed to record several different forms of autonomic nervous system activity for which empirical evidence has shown to be correlated with deception and truth-telling at rates for which they can be combined in structural and statistical models that produce classification accuracy rates that significantly exceed both random chance and unassisted human-expert lie detection. Other sensors have been proposed, including central nervous system, ocular, and facial recording technologies. However, the computerized polygraph systems of today continue to make use of autonomic signals, including respiration activity, electrodermal activity, vasomotor activity, and cardiovascular activity.

The cardiovascular sensor holds the greatest similarity to medical device technologies. Indeed, the traditional cardiograph sensor is simply a medical blood pressure cuff used at a sub-occlusive or semi-occlusive level of pressure. The traditional location for the attachment of the cardiograph sensor to the examinee – on the upper arm, over the brachial artery – is also borrowed from the medical profession. However, whereas measurement of blood pressure in a medical setting may take one or two minutes, polygraph testing may consist of a sequence of questions that may require five to seven, or more, minutes to complete. And the question sequences will be repeated multiple times. Moreover, some examinations may consist of multiple series of test questions, each of which may be repeated several times. It is therefore not surprising that the cardiograph sensor has been described by some polygraph examinees as a source of physical discomfort during testing. For this reason, there has been some interest in a cardiograph sensor solution that can acquire and record the signal of interest with less physical discomfort to the examinee. An improved sensor may improve the polygraph signals and may also permit the examinee to experience less distraction during testing.

Some alternatives have been suggested as potential replacements for the brachial arm cuff. These include a fingertip cardio sensor (Cestaro & Dollins, 1997) that was reported as not a viable alternative for the brachial arm cuff. Deployment of the cardiograph sensor on the lower leg has also been suggested – though this has been discouraged since medical professionals suggested that there may be increased risk for causing a dislodged thrombosis with this method [See Handler, Nelson, and Floyd (2016) for discussion.].[1] Thrombosis is a rare, though potentially fatal, medical emergency. No published or anecdotal events of dislodged thrombosis are reported to have occurred during polygraph testing. However, the cautionary statements of medical professionals should not be taken lightly, and the continued use of the leg cuff has been discouraged in recent years.

Another proposed solution is the deployment of the cardiograph sensor on the forearm. The forearm location is reported as less uncomfortable than the brachial arm cuff. Whereas the upper arm includes large and highly sensitive neurons, especially on the medial side of the arm, the forearm engages in frequent contact with the environment and may be more tolerant of several minutes of semi-occlusive pressure during polygraph testing. The forearm has the additional advantage of better

[1]Thrombosis, also thromboembolism, can occur with persons of any age. Risk for dislodged thromboembolism is increased with prolonged sedentary activity, such as while traveling or other conditions involving reduced blood circulation. A potential hazard is that a dislodged thrombosis travels to the lungs, with the potential for blockage of circulation, damage to the lungs, and even death (CDC, 2022, June 9).

social proxemics – meaning that it may be less physically intrusive and more comfortable for examiners to work effectively with the forearm cuff.

Replacement of a sensor, within the traditional array of polygraph sensors, is not uncomplicated. One approach to such replacement would be to obtain a volume of data, using the new sensor, that is sufficient to replace the data supporting the old sensor. This will include the recalculation of both the structural models and effect sizes. Another approach will be to hope for a *drop-in replacement* of the old sensor – without the need to replicate or repeat existing development and validation studies. A satisfactory drop-in replacement will require a very high correlation between data from the old and replacement sensors. This project is intended to investigate potential alternative placements or locations as a drop-in replacement for the deployment of the traditional brachial arm cuff, including the use of the cardiograph sensor on the lower leg[2] and the forearm.

Method

Polygraph data were collected for a cohort of young adult polygraph subjects using the normal array of polygraph recording sensors, along with an additional data interface device to record data for a second cardiograph sensor. Two sets of data were collected using the two simultaneous cardiograph sensors.

Participants

Participants include 16 young adults ages 25 to 37 with no known medical or mental health problems. There were 7 female and 9 male participants. All of whom were employed by the government of a Latin American country.

Instrumentation

Data were collected using a Dell portable laptop computer running the Windows 7 operating system connected to the LX5000 data acquisition system (Lafayette Instrument Co.), which includes recording channels for thoracic and abdominal respiration, cardiovascular activity, electrodermal activity, physical activity, and vasomotor activity. The data interface device was integrated with the LXSoftware version 11.4.1. An additional data acquisition system, an LX4000 (also from Lafayette Instrument Co., Lafayette, IN) was also integrated with the recording software. In this way, data could be captured simultaneously for the traditional cardiograph sensor deployed on the upper arm over the brachial artery, and a second cardiograph sensor deployed on the lower leg and forearm.

Data Collection

Data collection took place during 2015 and was supervised by the authors. Two samples were recorded for each participant. The recording activity consisted of a common polygraph acquaintance test – a form practice test used to familiarize the examinee and ascertain the correct functionality of the instrument prior to recording data for CQT formats. The acquaintance test format was the known-solution test, in which the subject is presented with a series of stimulus questions about their surname, and where they are instructed to answer incorrectly in response to the question that actually includes their surname. [Refer to Nelson, Prado, Blalock and Handler (2018) for detailed information on the history and use of the known solution acquaintance test.]

Two samples of data were obtained from each participant. One sample included the traditional brachial arm cuff with the second cardiograph sensor deployed on the lower leg. Cuff pressures for the brachial cuff were adjusted to 65mmHg during testing (Nelson, 2016). This pressure was selected because it is less than the average diastolic blood pressure (120/80mmHg), and therefore assumed to be semi-occlusive or sub-occlusive, and still sufficient to provide usable polygraphic

[2] Continued use of the leg cuff procedure is not recommended due to concerns expressed by medical professionals involving the potential for some increase in the risk of thrombosis. Leg cuff data are included in this analysis because data were available prior to the change in recommended procedures, and to show the potential advantages and differences inherent to different procedural solutions.

data while imposing less physical discomfort on the examinee than a high-pressure level. Cuff pressures for the leg cuff were increased to 90mmHg to improve the data quality, while still producing less reported physical discomfort to the examinees. Leg cuff pressures were close to the average mean arterial pressure (MAP)[3], and were assumed to remain sub-occlusive or semi-occlusive. The other sample included the traditional brachial arm cuff with the second cardiograph sensor deployed on the forearm. Forearm cuff pressures were limited to 65mmHg, well under average MAP, and produce less reported physical discomfort to the examinee than the traditional brachial arm cuff. The two cuffs were deployed on opposing sides, right and left, for each sample. Sixteen samples were obtained using the alternative leg cuff, and sixteen samples were obtained using the alternative forearm cuff.

To better understand the potential similarity and difference of data from different instruments operating simultaneously, a small number of cases were recorded using two forearm cuffs place on the right and left sides of the subject. Graphic results are shown in Appendix A for two cases for which the mean r = .959.

Analysis

Data were exported to the NCCA ASCII format (Editorial Staff, 2019) and imported to the R Language (R Core Team, 2022) for statistical computing. For each case, correlation coefficients were calculated for the recorded time-series data from the two cardio cuffs. Time series data were processed at 30 samples per second and were not subject to additional filtering or signal processing after recording. Mean correlation coefficients were then calculated for the brachial and leg cuff data, and for brachial and forearm cuff data.

Results

Polygraph test data from field examination is often observed to be of varying quality. The interpretable quality of cardiograph data can be impaired by several different types of data artifacts, including respiratory blood pressure fluctuation, fasciculations, physical movement, extrasystoles (ectopic heartbeats), arrhythmia, general instability, dampening and other artifacts. [Refer to Nelson (2022) for a description of common cardio artifacts during polygraph testing.] It may be expected that different deployment solutions for the cardiograph sensor may increase or decrease the robustness and vulnerability of cardiograph data to data artifacts.

Cardiograph sensor data can also exhibit a descending trend for several minutes after the initial placement and inflation. This common observation is thought by field polygraph examiners to be possibly due to conformation, when pressurized during data recording, of the elastic and textile materials used to construct the cardiograph sensor. This effect can be mitigated by careful procedures during deployment and is often reduced after the first few minutes of data recording. During field polygraph testing, the descending trend may be dissipated during the acquaintance test. Because this project involved only the acquaintance test, no opportunity for dissipation existed prior to data recording.

Visual inspection of the data for the two samples suggested they were of acceptable quality for use or interpretation, though with some variation in the ease or difficulty in working with the data for all sensor deployments. Also, differences were observed the occurrence of data artifacts for the different cardiograph sensor deployment locations. Data of good stable quality may vary differently from data of marginal or poor quality.

Perfect correlations are not expected for the different deployment locations for the cardiograph sensor. However, it can be expected that the strength of association for the data from different cuff locations may vary with data of different interpretable quality. Data of more

[3] Mean arterial pressure (MAP) is calculated as DP + 1/3PP where DP is the diastolic pressure and PP is the pulse pressure or difference between systolic and diastolic pressures (Handler, Geddes & Reicherter, 2007. According to DeMers & Wachs (2022) MAP values of 60mmHg or more are required to maintain perfusion, and reduction of MAP to below 60mmHg for extended periods of time may lead to ischemia and infarction.

stable quality may correlate more strongly for the different recording sensors, while artifacts and instability contribute to weaker associations between the different sensor solutions. For this reason, each sample was subject to a split half-analysis.

For each sample, correlations between the time-series data from the brachial and alternative cuff deployments were rank ordered and then divided into quartiles. For each sample, the lower split half consisted of quartiles 1 and 2, while the upper split-half consisted of quartiles 3 and 4. Each split half consisted of ½ of the cases for each sample. Means were then calculated separately for each sample and each split-half. Appendix C shows the plotted time-series data for the upper half (quartiles 3 and 4) of the leg cuff sample. Appendix D shows the data plots for the lower half (quartiles 1 and 2) of the leg cuff sample. Appendix E shows the plots for the upper half of the forearm cuff sample, and Appendix F shows the lower half.

Table 1 shows the Pearson correlation coefficient for each split-half of the two sample, along with the correlations of all quartiles combined for each sample. Confidence intervals were obtained using a Monte Carlo bootstrap procedure.

Table 1. Pearson correlation coefficients and [95% confidence intervals] for each split-half of the leg cuff and forearm cuff samples.

	Combined (all quartiles)	Lower half correlation (1st and 2nd quartiles)	Upper half correlation (3rd and 4th quartiles)
Brachial and leg cuff	r = .818 [.539, .971]	r = .701 [.521 .815]	r = .936 [.863 .973]
Brachial and forearm cuff	r = .852 [.561 .985]	r = .734 [.549 .903]	r = .969 [.955 .989]

To further understand the influence of the cardiograph sensor deployment on the data quality, data artifacts were coded by the second author for all cases, including respiratory blood pressure fluctuation, physical movements, fasciculations, general instability, extrasystoles, cardio-arrhythmia, and cardio-dampening. A frequency table of artifacts is shown for each sample in Appendix B. Table 2 shows the bootstrap means and the 95% confidence intervals, obtained using a Monte Carlo bootstrap, for the number of cases for which different types of cardio artifacts were observed. These intervals are an estimate of the range of proportions, based on the observed data, for which other cases may be expected to exhibit these cardio artifacts. Cardio arrhythmia and cardio-dampening were not observed in either of the two samples but were estimated at the .005 value.

Table 2. Mean and [95% CI] for the frequencies of observed cardio data artifacts

	Brachial and Leg Cuff (n=16)		Brachial and Forearm Cuff (n=16)	
	Brachial	Leg	Brachial	Forearm
RBPF (mild)	.005 [<.001, .063]	.312 [.125, .563]	.065 [<.001, .188]	.186 [<.001, .375]
RBPF (moderate to severe)	.125 [<.001, .313]	.004 [<.001, .063]	.440 [.188, .688]	.006 [<.001, .063]
Fasciculations	.064 [<.001, .188]	.062 [<.001, .188]	.004 [<.001, .063]	.004 [<.001, .063]
Physical movement	.005 [<.001, .063]	.005 [<.001, .063]	.005 [<.001, .063]	.062 [<.001, .188]
Extrasystoles	.064 [<.001, .188]	.062 [<.001, .188]	.005 [<.001, .063]	.006 [<.001, .063]
General instability	.005 [<.001, .063]	.005 [<.001, .063]	.126 [<.001, .313]	.004 [<.001, .063]
Arrhythmia	.005 [<.001, .063]	.005 [<.001, .063]	.005 [<.001, .063]	.005 [<.001, .063]
Dampened/unresponsive	.005 [<.001, .063]	.005 [<.001, .063]	.005 [<.001, .063]	.005 [<.001, .063]
Other artifact	.061 [<.001, .188]	.065 [<.001, .188]	.004 [<.001, .063]	.005 [<.001, .063]
Descending cardio data (25%)	.189 [<.001, .375]	.561 [.313, .813]	.125 [<.001, .313]	.126 [<.001, .313]

Inspection of the artifact frequencies suggests that deployment of the cardiograph sensor on the leg resulted in an increase in descending cardiograph data. Nine (9) of 16 cases in the leg cuff sample exhibited a cardio descent of 25% or more of the vertical (y-axis) graphic scale. This may be due to conformation and settling of the elastic and textile cuff materials after the cuff is pressurized and may subside after the first few minutes. Another observation is that the occurrence of moderate to severe RBPF was reduced for both alternative deployment locations, compared to the traditional brachial location.

Although the number of cases with moderate or severe respiratory fluctuation in the cardio data decreased when the cardiograph sensor was deployed on the leg and forearm, the number of cases for which a mild respiration signal was observe increased for both samples. For the purpose of coding these data, mild RPBF was defined as slight, though observable respiration pattern in the cardiograph data which was not expected to influence polygraph feature extraction or data analysis, and which could easily be ignored or overlooked.

A Kruskal-Wallis rank sum test (Hollander & Wolfe, 1999), a form of non-parametric ANOVA, was used to check the statistical distance between the frequency of occurrence of the cardiograph data artifacts shown in Table 2. This test was used because it does not assume a normal distribution, and can work with small sample sizes. With two samples it is equivalent to a Wilcoxon-Mann-Whitney test, also a non-parametric t-test, but can better tolerate the existence of tied values. Differences in the occurrence of cardiograph data artifacts were not statistically significant for deployment of the cardiograph sensor on the leg [p=.815, df=1, x^2=.052] or the forearm [p=.939, df=1, x^2=.006].

Discussion

This study involved the collection of simultaneous time-series recordings of the cardiograph data using the cardiograph sensor deployed in the traditional brachial location in addition to the leg cuff and forearm cuff deployments. Alternative solutions are desired for the traditional brachial arm cuff used in polygraphic credibility assessment testing for two main reasons: to reduce the vulnerability of the cardiograph sensor data to artifacts that may disrupt the usability of the data, and to reduce level of physical discomfort that may be experienced and reported by polygraph examinees. Data were obtained using a common form of acquaintance or practice test. Correlations were calculated for the two alternative cuff deployments. Very high correlations were observed for both sensors when the recorded data were stable and of acceptable interpretable quality.

Like all projects, this study is not without some limitations. The first limitation is that this study is limited to the polygraph context and does not involve the use of alternative cardio cuff deployments in medical use. Another limitation of this project is the small sample size. Although larger sample sizes are nearly always preferred, this small study does provide interesting information where no previous analytic information exists. A related limitation is that data for this study, like many polygraph studies, are limited to persons of normal functional characteristics in terms of both medical and mental health.

A further limitation of this project is that data for this study involved only the acquaintance test and does not include data from comparison question test charts. Although it may be tempting to speculate about whether meaningful differences will be observed between the cardiograph sensor correlations of acquaintance test data and comparison question data, such speculation is presently without supporting evidence as to any actual differences and why such differences might exist. Although the present correlation study indicates a very high correlation, for polygraph time-series data, between the cardiograph cuff deployment in different locations, future research should endeavor to evaluate polygraph outcome effect sizes using the forearm-cuff solution.

Some anecdotal observations were made during data collection for this study. It was observed that achieving stable data may be more difficult with the leg cuff than with the brachial and forearm cuffs. There were more observed cases in which the leg cuff data descended more than 25% of the graphical y-axis during

the acquaintance test exercise. This descending pattern can be the result of conformation of the elastic and textile cuff materials when pressurized. The descending trend in the data usually dissipates after a few minutes of time. In practical terms, this may indicate that effective deployment of the cardiograph cuff on the leg may be more complex or difficult.

Deployment of the cardiograph sensor requires intrusion of the examiner into the personal space of the examinee and requires some physical contact with the examinee. The forearm deployment in the personal proxemic zone (Hall, 1969) – about 18 to 48 inches surrounding a person – may provide more comfortable opportunity for examiners to work the cuff to a point of stability prior to data recording. In contrast, the brachial arm cuff may be considered closer to the intimate zone – the space less than 18 inches around a person. Deployment of the cardiograph sensor on the lower leg introduces the potential for additional social and personal difficulties when the examiner bends down in front of the examinee's legs, and this may contribute to ineffective deployment and an increased occurrence of descending data during the early minutes of data collection.

A not-unexpected observation was that examinees reported less physical discomfort from the deployment of the cardiograph sensor on the forearm and leg, compared the traditional brachial arm cuff. Causing other physical discomfort to other persons is a potential source of ethical controversy, even during professional interactions, and is therefore not without some need for discussion. Controversy of this type may be reduced when alternatives exist that contribute to less discomfort. Commensurately, the use of methods that contribute to physical discomfort may be viewed as more ethically questionable when viable alternatives exist. No subjective or objective data was captured in attempt to quantify the level of physical discomfort experienced by the examinees with any of the deployment solutions used in this project.

Other anecdotal observations were made. A potentially useful observation was that respiratory blood pressure fluctuation, a common involuntary condition which may complicate data analysis, may sometimes be reduced by simple strategies such as elevating the forearm, straightening the arm, and deploying the cardiograph cuff on the smaller part of the forearm above the wrist. A final observation was that deployment of the cardiograph cuff on the forearm was easier in some ways than the traditional brachial location – despite the fact that deployment of the cardiograph sensor on the forearm with persons with small sized forearms required more wrapping of the textile part of the sensor. Deployment on the forearm may become easier with the use of a cardiograph sensor that is sized more optimally for the forearm location. A final anecdotal observation was that conducting the examination with less physical discomfort may contribute to improved attention to the test stimuli and improved signal quality.

Replacement of a recording sensor solution that is supported by decades of validity research, published statistical models, and exhaustive field experience is a complex task. A convenient or ideal solution will be a replacement sensor solution in the form of a drop-in replacement that provides a very high correlation with the replaced sensor when data are of normal, un-artifacted, interpretable quality, while increasing the number of cases for which the cardiograph sensor data will remain usable. In this project, very high correlations were observed between two alternative deployment locations for the cardiograph sensor – the lower leg and the forearm. Correlations were weaker when data from one of the sensors was descending more than the other during recording, and when data was unstable. Correlations were stronger when data from both sensors were stable and when data from both sensors were descending. These results suggest that field examiners should take care to ensure the stability and usability of cardiograph sensor data prior to recording onset.

Results from this study suggest that two alternative cardiograph sensor deployment solutions, leg cuff and forearm cuff, may be suitable for drop-in use, and may provide some

advantages in terms of improved data quality. However, concerns about thrombosis, a serious medical event, however, rare, should preclude further interest in the use of the leg cuff deployment. There may be ethical discussion around the use of a solution that increases medical risk when options exist with less medical risk and which may be similarly or potentially more effective. Replication of this study, and continued interest in the forearm cuff deployment are recommended.

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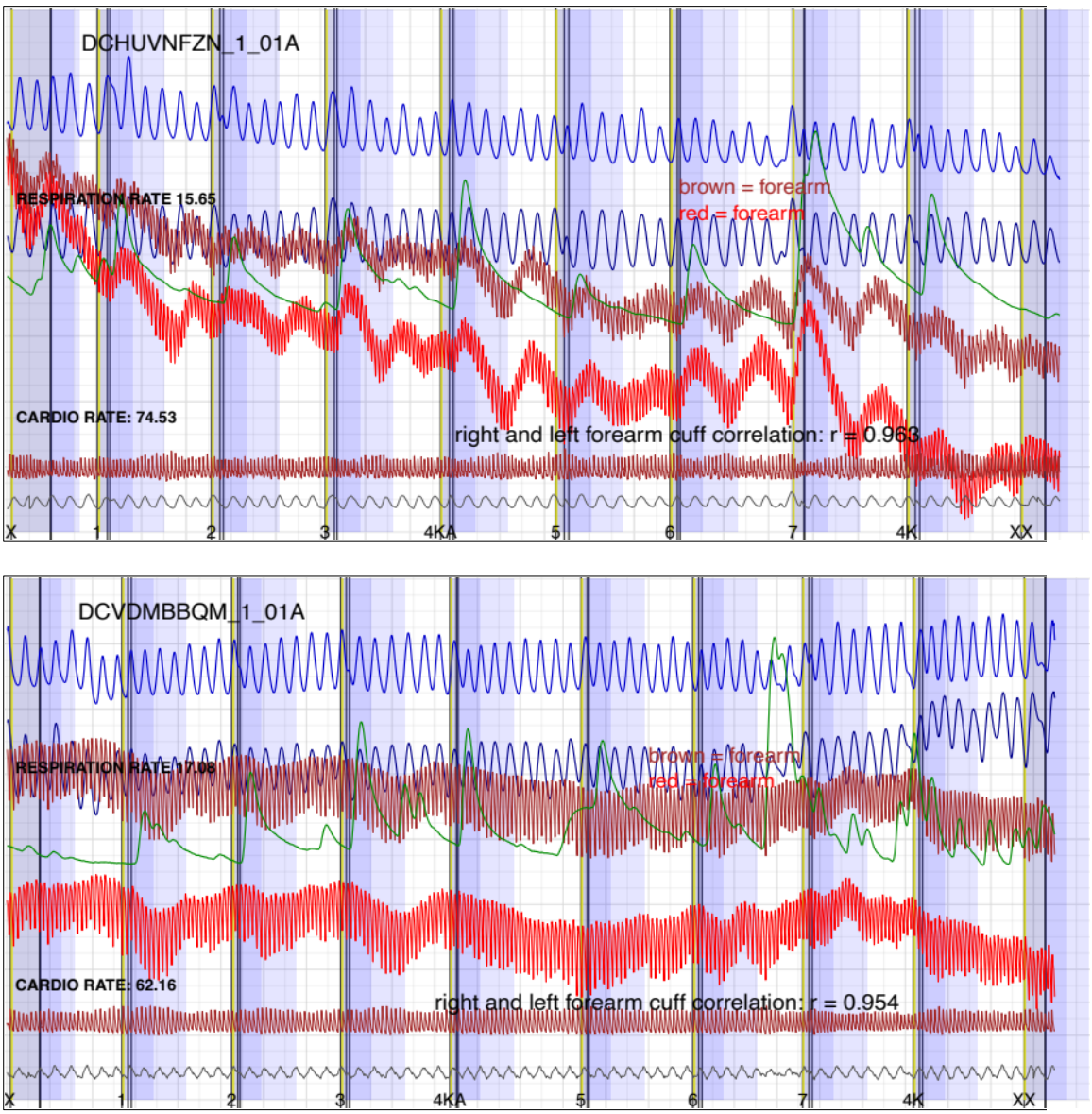
Appendix A
Graphic Plots for Two Forearm Cuffs

Mean correlation r = .959



Appendix B
Artifact Codes for Leg and Forearm Cuff Data

Table B-1 – Observed artifacts for brachial and leg cuff data. (B = brachial arm cuff, L = leg cuff)

Case	RBPF (mild)	RBPF (mod/sev)	Fasciculation	Phys Mvt	Extrasystole	General Instability	Arrythmia	Unresponse	Other	Descending
OGSGRVTB										B L
TVEHYBQK										B L
BDWEALAD	L								B L	B L
UDFXDVVH										
AOSJYJBX		B								
OHOCSBEB	L		L							L
ZPEGMBHY										L
JMMXNYDT		B	B							L
NBDUSTSY					B L					
KXQPLAOF	L									
WTYOQNQL										
QTXIDVHL	L									L
RRFZYFVS	L									L
WUUCRKKB										
ROTUIIXT										
VHYUQLXN										L

Table B-2 – Observed artifacts for brachial and forearm cuff data. (B = brachial arm cuff, F = forearm cuff)

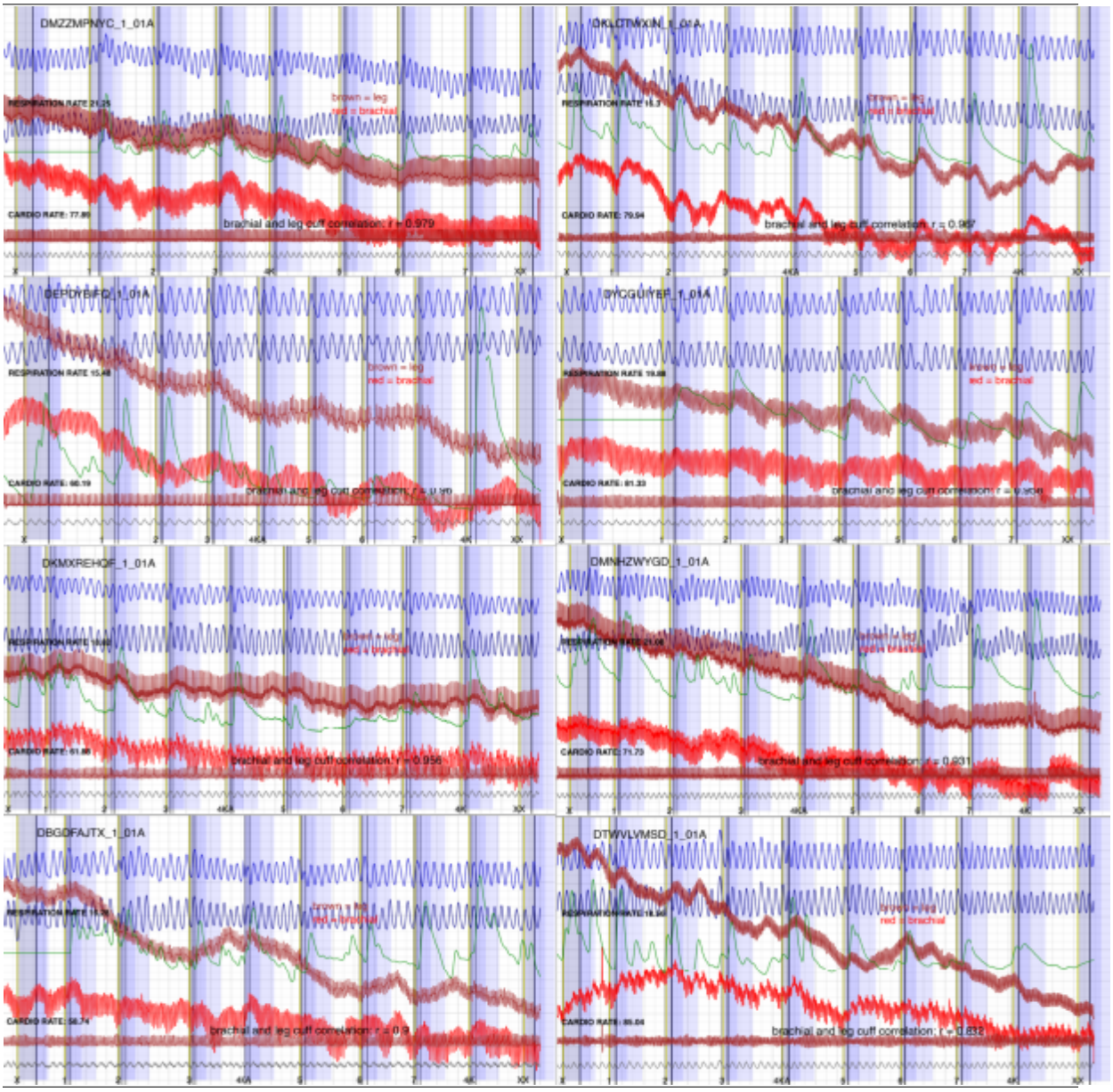
Case	RBPF (mild)	RBPF (mod/sev)	Fasciculation	Phys Mvt	Extrasystole	General Instability	Arrythmia	Unresponse	Other	Descending
MZZMPNYC										B F
KLCTWXIN										B
EPDYBIFQ										
YCGUIYEF		B								B
KMXREHQF										
MNHZWYGD										
BGDFAJTX		B								B F
TWVLVMSD	F	B								
YMITRQYP	B F									
QLTSJOBX										
XTPCIBJD										
MNSIGFCN	F	B				B				
JGTBVRYE		B								B
XNXXJEBE		B								B
QETHLJDC		B		F		B				
JSJWOJEU										

Table B-3. Frequency of cases with observed cardio artifacts, and [95% CI]

	Brachial and Leg Cuff (n=16)		Brachial and Forearm Cuff (n=16)	
	Brachial	Leg	Brachial	Forearm
RBPF (mild)	0	5	1	3
RBPF (moderate to severe)	2	0	7	0
Fasciculations	1	1	0	0
Physical movement	0	0	0	1
Extrasystoles	1	1	0	0
General instability	0	0	2	0
Arrhythmia	0	0	0	0
Dampened/unresponsive	0	0	0	0
Other artifact	1	1	0	0
Descending cardio data (25%)	3	9	2	2

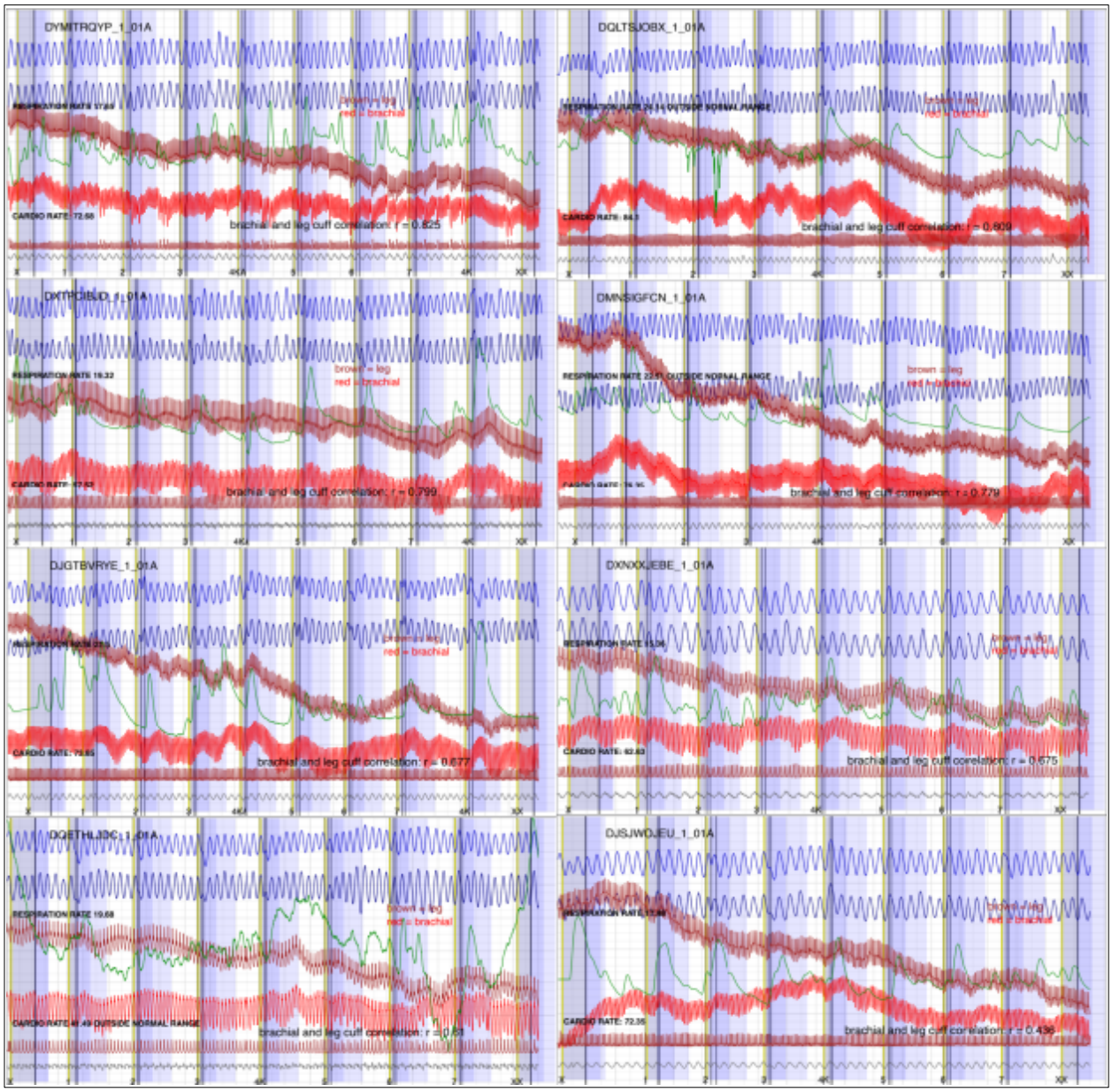
Appendix C
Graphic Plots for Brachial and Leg Cuff Data: Upper Half (3rd and 4th Quartiles)

```
an(corDAT[rev(order(corDAT))][1:8])
[1] 0.9355954
```



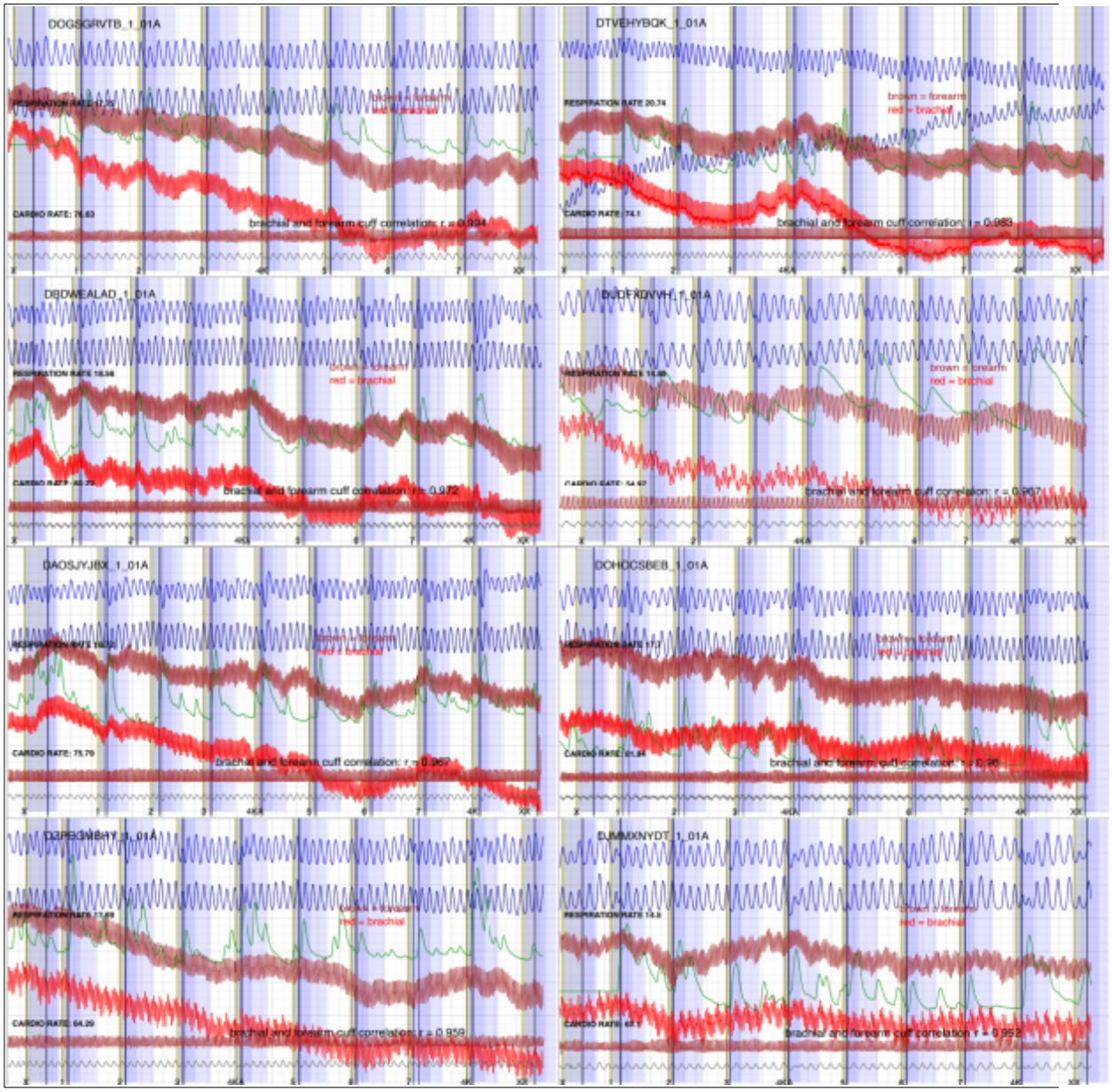
Appendix D
Graphic Plots for Brachial and Leg Cuff Data: Lower Half(1st and 2nd Quartiles)

```
mean(corDAT[rev(order(corDAT))][9:16])
# [1] 0.7013204
```



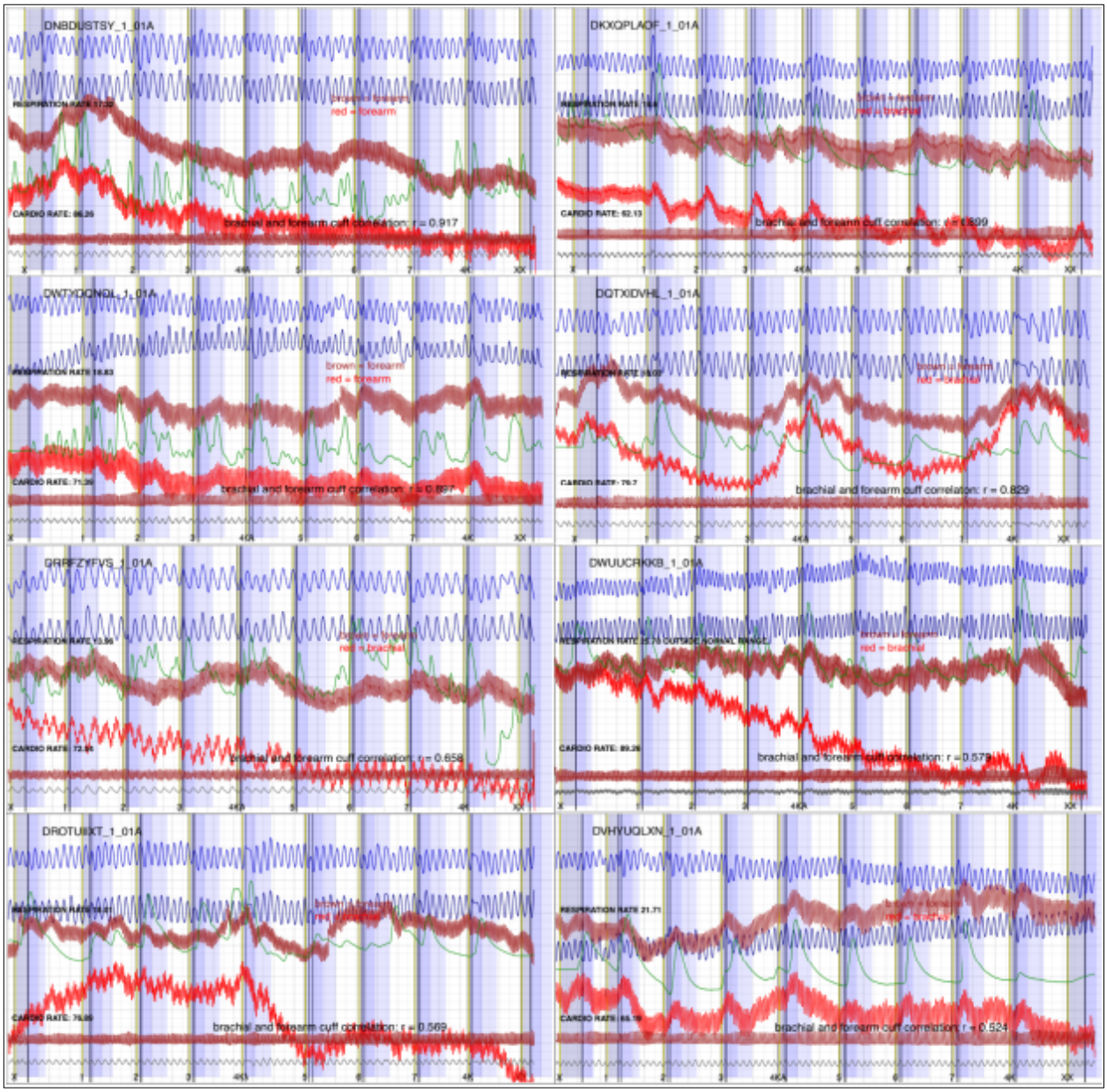
Appendix E
Graphic Plots for Brachial and Forearm Cuff Data: (3rd and 4th Quartiles)

```
mean(corDAT[rev(order(corDAT))][1:8])
# [1] 0.9692815
```



Appendix F
Graphic Plots for Brachial and Forearm Cuff Data: Lower Half
(1st and 2nd Quartiles)

```
mean(corDAT[rev(order(corDAT))][9:16])
# [1] 0.733963
```



Short Report
ESS Scores of Electrodermal Data: No Differences Found Between Manual and Detrended Display Modes

Donald J. Krapohl[1]

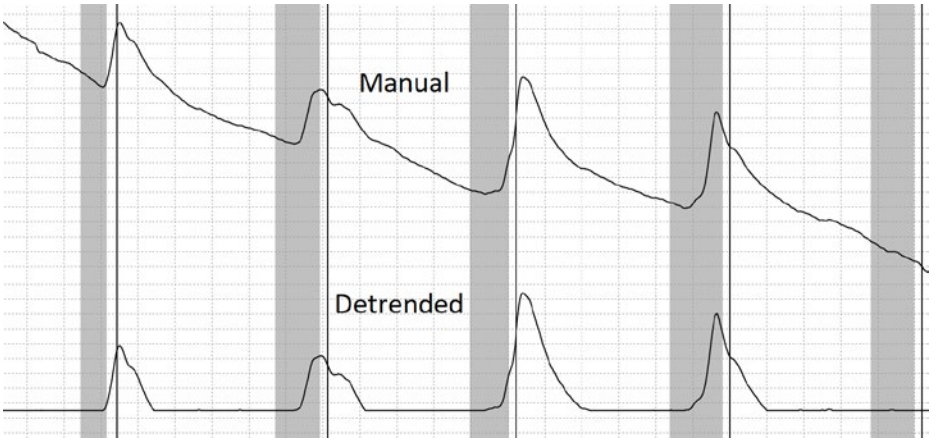
Donnie W. Dutton[2]

Donald Grubin[3]

In a previous issue of this journal Krapohl and Dutton (2022) reported the use of a one-year exhaustive sample of field screening polygraph examinations to investigate the influence of self-centering (called Automatic) and non-centering (called Manual) electrodermal filters on manual scoring in the Lafayette Instruments software. In brief, the study found that the displays for the two electrodermal activity (EDA) modes resulted in different scores in 189 of the 760 (25%) cases evaluated, and different test results in 49 (6%). Nearly all of the differences in the latter related to cases where one of the filters resulted in an inconclusive outcome and the other either truthfulness or deception, but in one case the EDA mode would have produced a decision of deceptiveness with one filter and truthfulness with the other. Decision accuracy could not be calculated due to the absence of ground truth in the source of the data.

In addition to the Manual and Automatic EDA modes the Lafayette instrument also has the Detrended mode. The Detrended mode was designed to control the degree to which the EDA tracing falls toward the bottom of the display (See Figure 1). It does not influence the EDA tracing in its rise toward the top of the display, nor does it change the relative amplitudes of phasic responses as compared to the Manual mode.

Figure 1. Examples of electrodermal data displayed in the Manual and Detrended modes at the same gain setting.



[1] APA President, and employed by the firm Capital Center for Credibility Assessment.
[2] APA President elect. Mr. Dutton is Vice President of the Capital Center for Credibility Assessment.
[3] Emeritus Professor of Forensic Psychiatry at Newcastle University and CEO of Behavioural Measures UK.
[4] Personal communication with the developer, Dr. Raymond Nelson of the Lafayette Instrument Company.
Comments and questions should be directed to the first author at APAkrapohl@gmail.com.

In the present assessment we evaluated a new data set of field polygraph cases to determine whether the Detrended mode would produce different scores and decisions from those that were based on the Manual mode. We were unable to find any previous research that compared the effect of using one mode or the other on numerical scoring by human scorers.

Method

Data

From July 1 through December 31, 2022, we evaluated all cases submitted for quality control review from a large sex offender management program, a total of 367 cases. All cases were conducted on Lafayette computer polygraphs, either LX5000 or LX6. As with the Krapohl and Dutton (2022) comparative study of the Automatic mode, cases were anonymized prior to submission for evaluation, and consequently no demographic characteristics of the examinees could be captured. Similarly, the quality control review of the tracings offered no access to information regarding disclosures the examinees may have made during the posttest interview, preventing any assessment of the accuracy of the polygraph decisions. All cases were screening examinations.

The sex offender polygraph program uses the Empirical Scoring System (ESS; Blalock, Cushman & Nelson, 2009; Nelson, Krapohl & Handler, 2008) in which scores of 0 or +/-2 are assigned. Score assignment in the EDA for this program requires a minimum difference of 10% in response amplitudes between those elicited by relevant and comparison questions and a minimum response onset latency of 1.2 seconds. The caliper function in the Lafayette software was used to verify whether the thresholds had been met.

The total number of possible EDA scores from the 367 cases in the sample was 2769. Data from 8 cases (2.2%) were not considered because of examinee physical countermeasures or contaminated data. The exclusion of those scores resulted in 2723 scores for analysis.

Procedure

The first author scored each case with the EDA mode set to Manual, which is the standard for this sex offender management program, followed by a rescoring in the Detrended mode. The information for each case was tracked in an Excel spreadsheet which included the case number, date of review, testing technique, examiner decision, quality control decision, if digitized voice was used in testing, and whether scores were different between the Manual and Detrended mode.

Results

The scores between the Detrended and Manual mode were identical across all cases. Given the perfect agreement, no statistical analyses were conducted. In addition, no differences in the response onset latency between the Detrended and Manual modes were observed.

Discussion

In this first published comparison between the Detrended and Manual modes for the EDA tracing in the Lafayette Instruments computer polygraph no differences were found in manual scores. While we encourage replication, these data support the statement of Lafayette's Dr. Raymond Nelson that the Detrended mode preserves the amplitude of electrodermal responses displayed in the Manual mode. It seems reasonable, therefore, for field examiners to use whichever of Detrended or Manual mode they prefer, or to use them interchangeably in their scoring.

A previous large sample study (Krapohl & Dutton, 2022) found differences in scores between Manual and Automatic modes. Because scores between Detrended and Manual modes were found to be identical it follows that comparisons between Detrended and Automatic modes would likely find that the scores do not always align, and that decisions based on manual scores in which the Automatic mode was used would differ from those in the Detrended mode in about one case in four.

Summary

We found no differences between EDA scores in the Manual and Detrended modes. Each appears to capture the same scorable information from the phasic responses.

Limitations

Because the data source and procedures in the Krapohl and Dutton (2022) study were repeated for the present study, our current findings share the same limitations.

- Only Lafayette Instruments' polygraphs were used in this study. While other manufacturers also have more than one EDA mode, the effect of those modes on manual scoring may be different from what we found. We encourage research to explore what those effects might be.

- The scoring of electrodermal responses in this study required EDR amplitudes to be objectively different by at least 10%. The present findings may not generalize if scorers use a different, or no specified, minimum threshold when assigning scores.

- The scoring method used in this study was the Empirical Scoring System. It is not known whether there would be similar findings with 3- or 7-position scoring, rank order methods, or global analysis. We know of no such published analyses.

- Ground truth was unavailable, so our study could not address the important issue of decision accuracy. It only relates to EDA modes on polygraph scores and decisions.

References

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Nelson, R., Krapohl, D. J. and Handler, M. (2008). Brute Force Comparison: A Monte Carlo study of the Objective Scoring System version 3 (OSS-3) and human polygraph scorers. *Polygraph, 37(3)*, 185 – 215.

DEFENSE INTELLIGENCE AGENCY

WASHINGTON, D.C. 20340-5100

FAC-2C

March 16, 2021

Donald Krapohl
PO Box 11
Blythewood, SC 29016

This responds to your Freedom of Information Act (FOIA) request, dated September 24, 2015 that you submitted to the Defense Intelligence Agency (DIA) for information concerning Requesting a copy of Report Number DoDPI01-R-0002 maintained in the electronic holdings of the National Center for Credibility Assessment (NCCA) titled A Test of the Counterintelligence Screening Polygraph Process by Andrew B. Dollins, Stuart M. Senter, and Dean A. Pollina, dated August 2001. I apologize for the delay in responding to your request. DIA continues its efforts to eliminate the large backlog of pending FOIA requests. In order to properly respond, it was necessary to consult with other agencies.

A search of DIA's systems of records located one document (95 pages) responsive to your request.

Upon review, I have determined that some portions of the document (95 pages) must be withheld in part from disclosure pursuant to the FOIA. The withheld portions are exempt from release pursuant to Exemptions 1, 3, 6, and 7 of the FOIA, 5 U.S.C. § 552 (b)(1), (b)(3), (b)(6) and (b)(7). Exemption 1 applies to information properly classified under the criteria of Executive Order 13526. Exemption 3 applies to information specifically exempted by a statute establishing particular criteria for withholding. The applicable statutes are 10 U.S.C. § 424, 50 U.S.C. § 3024(i) and 50 U.S.C § 3605. Statute 10 U.S.C. § 424 protects the identity of DIA employees, the organizational structure of the agency, and any function of DIA. Statute 50 U.S.C. § 3024(i) protects intelligence sources and methods. Statute 50 U.S.C. § 3605 protects NSA functions and information. Exemption 6 applies to information which if released would constitute an unwarranted invasion of the personal privacy of other individuals. Exemption 7(E) protects from disclosure records or information compiled for law enforcement purposes, but only to the extent that the production of such law enforcement records or information would disclose techniques and procedures for law enforcement investigations or prosecutions, or would disclose guidelines for law enforcement investigations or prosecutions if such disclosure could reasonably be expected to risk circumvention of the law.

If you are not satisfied with my response to your request, you may contact the DIA FOIA Requester Service Center, as well as our FOIA Public Liaison at 301-394-6253.

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Office of Government Information Services
National Archives and Records Administration
8601 Adelphi Road-OGIS
College Park, MD 20740-6001

You may also exercise your right to file an administrative appeal by writing to the address below and referring to case number FOIA-00522-2015. Your appeal must be postmarked no later than 90 days after the date of this letter.

Defense Intelligence Agency
7400 Pentagon
ATTN: FAC-2C (FOIA)
Washington, D.C. 20301-7400

Sincerely,

(for)
Steven W. Tumiski
Chief, Records Management and Information Services

Enclosure: a/s

Report No. DoDPI01-R-0002

Pages: 10, 14, 15, 21, 49 thru 73, 78 thru 81, 90 and 91 are denied in full (DIF), and will not be provided.

A Test of the Counterintelligence Screening Polygraph Process

(b)(3):10 USC 424;(b)(6)

August 2001

Department of Defense Polygraph Institute
Fort Jackson, SC 29207-5000

1

Acknowledgements

(b)(3):10 USC 424;(b)(6)

The authors of this report are responsible for the planning, implementation, analyses, and presentation of this project. We are also the first to acknowledge that this project has been successful only because of the enthusiastic support and efforts of many people and agencies within the Federal government. We would like to thank the following organizations for supporting this project:

(b)(3):10 USC 424;(b)(6)

(b)(3):10 USC 424

Finally, we would like to simultaneously thank anyone we failed to mention and apologize for leaving them out.

This effort was supported by funds from the Department of Defense Polygraph Institute as projects, DoDPI00-P-0005, DoDPI00-P-0033, and DoDPI01-P-0001. The views expressed in this manuscript are those of the authors and do not reflect the official policy or position of the Department of Defense or the U. S. Government.

Abstract

(b)(3):10 USC 424 A test of the counterintelligence sceening polygraph process, (b)(3):10 USC 424
(b)(3):10 USC 424
(b)(3):10 USC 424 This action was based on the results of two research studies. Results of the first study implementing the TES question procedure indicate that the original examiners correctly identified 48 of the 54 (88.9%) nondeceptive and 25 of the 30 (83.3%) deceptive examinees (data from seven examinees were omitted from analysis). Results of a second TES procedure study indicate that the examiners correctly identified 50 of the 51 (98.0%) nondeceptive and 25 of the 30 (83.3%) deceptive examinees (three examinees were omitted). (b)(3):10 USC 424
(b)(3):10 USC 424
(b)(3):10 USC 424 A more realistic mock crime procedure was used, during this project, to test 50 nondeceptive and 52 deceptive examinees. In addition, we attempted to simulate the entire counterintelligence screening polygraph process by including Modified General Question Technique breakout examinations to further resolve the results of the TES examinations. Results indicate that 43 of the 50 (86%) nondeceptive and 40 of the 52 (77%) deceptive examinees were correctly identified using procedures similar to those used in the field. These data suggest that the procedures currently in use are effective in detecting deception. Finally, results of breakout testing indicate promising future research direction for accuracy improvement.

Key Words: Detection of Deception, Lie Detection, Polygraph, Screening

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Table of Contents

Introduction

The psychophysiological detection of deception (PDD; i.e., lie detection) is a process for determining if an individual is responding truthfully to a series of questions. A PDD examination can be divided into three stages: the pretest, the in-test, and the posttest.

During the pretest the PDD process and rationale are explained to the examinee. In addition, the instrument, which is usually referred to as a polygraph, and its operation is explained. The issues the examinee will be tested on are explained, discussed, and clarified and the actual questions to be asked during the examinations are reviewed.

During the in-test sensors are attached to the examinee. The sensors typically include two convoluted pneumatic tubes, placed around the thorax and abdomen to measure respiration, an auscultatory (e.g., blood pressure) cuff placed around an upper arm to measure cardiovascular responses, and two metal plates placed on the distal phalanges of the first and third fingers of the hand opposite the auscultatory cuff, to measure electrodermal responses. Once the sensors have been placed, the auscultatory cuff is inflated and the examinee is asked a series of questions. The examinee must usually answer yes or no to each question. Between one and four question series may be administered during the in-test. A question series refers to a sequence of questions asked in a specific order. The series is composed of about 12 questions and lasts roughly four minutes, which is the amount of time the examinee can tolerate the auscultatory cuff without major discomfort. There is a two to five minute break between question series, during which the cuff is deflated.

The posttest consists of the examiner's evaluation of the physiological data and an interview with the examinee to discuss the examiner's decision regarding the examinee's veracity. The posttest can last from a few minutes to several hours, depending on the information discussed.

PDD examinations can be divided into those intended to detect deception regarding a specific issue and those intended to detect deception to a broad range of topics. These are frequently referred to as specific issue and screening examinations, respectively. There have been many laboratory studies (Barland & Honts, 1990; Blackwell, 1994; Honts, 1992; Honts & Barland, 1990; Honts, Barland, & Barger, 1989; Honts, Raskin, & Kircher, 1987, 1994; Ingram, 1996a, 1996b; Kircher & Raskin, 1988; Podlesny, 1976; Podlesny & McGhehee, 1987; Podlesny & Truslow, 1991, 1993; Raskin &

Hare, 1978; Raskin, Kircher, Honts, & Horowitz, 1988) and field studies (Barland & Raskin, 1976; Bersh, 1969; Elaad & Kleiner, 1990; Elaad & Schahar, 1985; Guertin & Wilhelm, 1954; Honts & Raskin, 1988; Hunter & Ash, 1973; Rafky & Sussman, 1985; Slowick & Buckley, 1975; Yamamura & Miyake, 1980; Yankee, Powell, & Newland, 1985) of specific issue PDD examinations. Specific issue examinations are believed to be highly accurate because, at least in part, they address a single clear issue (e.g., a specific crime or act). During the examination, the issue in question is very clear to both the examiner and the examinee. Screening examinations are different from specific issue examinations because they typically address multiple issues that are not clearly defined (e.g., espionage or misuse of equipment). Most examinees taking counterintelligence screening examinations have done nothing untoward and are being completely truthful. Some examinees may not be sure if they are being truthful because the parameters of the questions require explanation and definition.

There have been relatively few studies of screening examination accuracy (Brownlie, Johnson, & Knill, 1998; Correa & Adams, 1981; Department of Defense Polygraph Institute Research Division Staff, 1997, 1998; Honts, 1999; Kircher, Woltz, Bell, & Bernhardt, 1998). These studies, as with most laboratory studies, required that examinees participate in one PDD examination that consisted of a predetermined number of question series followed by a veracity decision. (b)(3):10 USC 424

(b)(3):10 USC 424

Because there is a dearth of screening PDD examination research, a long range research objective is to determine and document the accuracy of the PDD examinations currently used for screening by the Federal Government. The primary objective of this research was to determine the accuracy of the counterintelligence screening polygraph process used within the Department of Defense. The first step in this process is a polygraph examination using the Test for Espionage and Sabotage (TES) format. (b)(3):10 USC 424

2

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(b)(3):10 USC 424 (b)(3):10 USC 424 This decision was based on the results of two studies conducted by the Department of Defense Polygraph Institute (DoDPI) (b)(6) During the first study (DoDPI Research Division Staff, 1997), 48 of the 54 (88.9%) nondeceptive and 25 of the 30 (83.3%) deceptive participants were correctly identified using the TES PDD examination. Results of the second study (DoDPI Research Division Staff, 1998) indicated that 50 of 51 (98.0%) nondeceptive and 25 of 30 (83.3%) deceptive participants were correctly identified using the TES PDD examination. The 30 deceptive participants in both studies enacted one of four distinct mock crime scenarios, resulting in a very small number of participants in each cell of the design.

(b)(3):10 USC 424

(b)(3):10 USC 424

It was predicted that at least 80% of the deceptive and 80% of the nondeceptive participants in the project would be correctly identified as deceptive and nondeceptive, respectively.

3

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Method

Participants

Participants were solicited using a classified advertisement in a local newspaper. After eliminating duplicate calls from the same individuals using the same or different phone numbers, calls without messages, and calls without return phone numbers, approximately 972 individuals called over a six week period. We were unable to contact 612 of those individuals. Of the 360 returned calls, 147 were ineligible and 37 were eligible but declined to participate, primarily due to scheduling conflicts. The remaining 176 individuals agreed to participate and were scheduled. Of the 176 individuals scheduled, 37 did not arrive as scheduled, 9 arrived but withdrew after receiving mock spy instructions, 11 did not successfully complete the mock spy scenario, 4 failed to return to complete testing, 7 confessed to involvement in the mock spy scenario during the PDD examination, and 6 participants were released as unsuitable for testing. Of the 6 released participants: 1 was debriefed prematurely, 1 was suspected of intoxication, 1 displayed a physiological anomaly, 1 had not slept for over 20 hours prior to the examination, 2 did not follow the examiner's instructions.

The 102 participants who successfully completed the project included 19 African American females, 6 African American males, 51 Caucasian females, 25 Caucasian males, and 1 Puerto Rican male. Participant age ranged from 19 to 60 with a mean age of 34.8 years (*SD* = 13.1).

Payment

Participants were paid $5.00 per completed half hour of participation plus a bonus of $200.00 if they were not found to be deceptive following the TES examination. Participants who were identified as deceptive during the TES examination did not receive a bonus. Participants were paid, in cash, after they had been debriefed.

Examiners

The eight examiners who participated in this study were certified by their respective federal agencies and had completed the TES and appropriate computerized polygraph courses. The examiners, who were from agencies which routinely use the TES procedures, were selected by the Director of the DoDPI, in consultation with the examiners' federal agency program managers, to participate in the study. A member of the Department of Defense Polygraph Institute Quality Assurance Program supervised the examination process and served as the quality control officer. Prior to beginning the study, the examiners participated in a two-

hour briefing to familiarize them with the study procedures. Each examiner's first examination was individually monitored by an instructor from the Department of Defense Polygraph Institute to ensure that correct procedures were followed. Neither examiners testing participants nor examiners acting as quality control personnel were told the proportion of deceptive participants or whether participants were deceptive or nondeceptive (single blind) until all testing was completed.

Apparatus

The physiologic measures (electrodermal, respiratory, and cardiovascular activity) routinely evaluated during field PDD examinations were recorded. Data were collected using a Lafayette (Model # LX2000, Lafayette Instrument, Lafayette IN) or Axciton (Interface Box Version S7.1, Axciton Systems Inc., Houston TX) computerized polygraph system to transduce, amplify, record, and display physiologic responses. The electrodermal amplifiers were set to automatic mode on all instruments. Data were recorded to computer disk and later copied to other media for archival purposes. The physiological recordings that were edited and printed by the original examiner were evaluated to determine participant veracity. Participants were seated in a Lafayette adjustable-arm chair (Model # 76871, Lafayette, IN) during testing. The PDD examination pretest, in-test, and posttest were recorded, for quality control purposes, using standard off the shelf audiovisual equipment. Communication among study collaborators was maintained using off the shelf portable radio transceivers.

Procedures

The procedures used during this project were approved by the University of South Carolina Institutional Review Board (USC IRB Approval 12-21-00-07-27-01). A classified advertisement titled "Polygraph Study" was placed in the local newspaper for six weeks, beginning one week prior to testing (Appendix A). The advertisement promised payment of $10 per hour for up to 15 hours and the potential to earn a $200 bonus. Interested parties were directed to call a local phone number. Calls were answered directly or by voice mail asking callers to leave a message. During the initial contact, interested persons were asked a series of questions designed to identify eligible participants.

Initial eligibility was established using the guidelines specified in DoD Directive 5210.48 (1984) and associated regulations (i.e., Department of the Army Regulation No. 195-6, 1980; United States Army Criminal Investigation Command Regulation No. CIDR 195-28, 1987). These regulations essentially direct that PDD examinations will not be administered to individuals who cannot respond due to: (a) physical discomfort or disability; (b) mental

or physical fatigue; (c) mental disorder; (d) extreme emotional stress, intoxication, narcotic addiction, or excessive use of depressants, stimulants, tranquilizers, or hallucinogens. While not specifically exempted by regulations, pregnant females were not tested during this study. In addition, participants were required to be between 19 and 60 years old, to be native English speakers, and to have matriculated at a college, university, or other post-high-school educational institute. Persons who had a previous polygraph examination or security clearance were excluded. Persons who were personally acquainted with or otherwise related to project personnel were excluded. To remain eligible, individuals also had to agree to answer questions about their medical history, including prescription drug usage. Individuals who met these criteria, and who indicated they were interested and had the time to participate, were certified as eligible and their contact information was given to a collaborator who actually scheduled the testing.

Participants were assigned to the deceptive or nondeceptive group based on a predetermined time schedule and their availability for testing. Participants in the deceptive group participated in a mock spy scenario and then attempted to deceive the PDD examiner regarding their involvement in the spy scenario. Participants in the nondeceptive group followed the same procedures as those in the experimental group except they did not participate in the mock spy scenario. Nondeceptive participants were instructed to be truthful and not to deceive the PDD examiner.

A scheduler contacted each eligible participant via telephone and arranged for a test time, then gave the participant directions to a parking garage (where free parking was provided) and to the nearby test site. The test site was an occupied multi-story building in which study space was rented on four different floors. Participants were given an appointment time and told to enter a specific room at that time and to follow the instructions on the table in that room. Participants were only told that they were participating in a polygraph study. They were told general schedule parameters (deceptive participants spent approximately 2 hours the first day and 3 to 6 hours the next day; nondeceptive participants spent 3 to 6 hours in a single day), to come alone, that they would not be allowed to communicate with anyone outside the project while participating, and that they should plan to spend time sitting comfortably while being tested.

Successful participants entered a room (four different rooms were used) on the fourth floor of the test site and followed the instructions on the table in that room. A video camera concealed in the room allowed investigators to view participant arrival and progress using monitors in a nearby room. The instructions

(Appendix B) directed participants to read and sign an informed consent form, then to listen to and follow the tape recorded instructions. See Appendix C and D for nondeceptive and deceptive participant consent forms, respectively. The recorded instructions informed participants assigned to the nondeceptive group that they were participating in a research project designed to test screening polygraph procedures. The payment and bonus conditions were reviewed. Participants were instructed to be completely truthful and to cooperate with the examiner during the polygraph examination (see Appendix E). Participants were told to replay the instructions if they had questions and to open the door to the room and wait when they were ready to begin the examination.

The instructions to participants assigned to the deceptive group were longer and more detailed (see Appendix F). They were instructed to write their name, a telephone number, and a time they could be reached by telephone that night on a card and to place the card in a U.S. Government Messenger envelope on the table. The envelope also contained a 3.5 inch floppy diskette bearing a TOP SECRET security classification label. Participants were instructed to address the envelope to Mr. Boris Mansky, Maintenance, Room XXX. Deceptive participants were instructed to enter an office (which had the emblem of the fictitious National Security Service on the door) on another floor of the building, convince the receptionist to leave the area using a specific ruse, to enter an adjacent door marked AUTHORIZED PERSONNEL ONLY, and to locate a specific file in the bottom drawer of a file cabinet. They were instructed to substitute the disk they carried for an identical disk in the file cabinet, and to take an aerial photograph (also marked TOP SECRET). They were to place the disk and photograph from the file cabinet along with the card containing their contact information in the preaddressed messenger envelope and leave it in the out box on the receptionist's desk. The participant was then to return to the room where they received instructions, pick up their parking stub (which was validated in their absence), and leave the building. The instructions also directed deceptive participants to be careful not to leave fingerprints or identifying information in the office and to prepare an alibi in case they were caught. Participants were further instructed to discuss their actions with no one and to be careful not to act suspicious or draw attention to themselves. Deceptive participants were told to expect a call from Boris Mansky that night, that they should meet with Mr. Mansky who would pay them $200 (which they were cautioned to count) for the stolen material and explain details of the polygraph test they were about to take. The payment and bonus conditions were also reviewed and they were told that they must be found nondeceptive to receive the bonus.

That night deceptive participants were called by a man identifying himself as Boris Mansky who thanked them for sending him the important information and arranged to meet them in a specific room on a different floor of the building they had been in earlier. In most cases participants met Boris the following day. Participants who enacted the mock crime on Friday met Boris on Monday. Participants who failed to correctly complete the mock spy scenario were contacted, the error explained, and payment for time spent arranged. In most cases the errors occurred when participants failed to switch the information correctly. Participants usually knew they had made an error and explained that they were nervous and forgot something or were hurried and made a mistake.

Each deceptive participant met with Boris for ten to fifteen minutes prior to taking their polygraph examination. Boris first presented the participant with a business card that identified him as a Cultural Attache for a fictitious country. Boris showed the participant the envelope he had received and spent a moment carefully examining the satellite photo. Boris then, without touching the diskette himself, instructed the participant to cut the disk into pieces, to conceal a piece of the disk containing the TOP SECRET label on their person, and to dispose of the piece when they left the building. If a participant asked about the disk, Boris explained that the disk they left contained erroneous coordinates to be used by American Bombers. Boris clearly identified himself as a case officer and a foreign national without a U.S. security clearance. Boris gave the participant two $100 bills and required them to sign a receipt and show a picture identification card. He told the participant "You have now committed espionage and now I have proof. Now we're really partners." He very clearly explained to the participant that they had committed espionage, sabotage, unauthorized disclosure of classified material, and had contact with a foreign spy. Boris then explained that the participant would be taking a polygraph examination designed for security screening. He instructed the participant not to reveal any information about the mock spy scenario, meeting himself, the $200 payment, or any acts they had committed during the examination. He further explained that the participant would only receive the $200 bonus if they were found to be truthful during the polygraph examination. Boris then took the envelopes, satellite photo, scissors, receipt, and other possessions and left the room, explaining that someone would arrive to escort them to the polygraph examination in a few minutes. Boris then waited in the nearby hallway where he could watch the meeting room to be sure participants didn't try to leave the area with the $200 he had paid them. Boris was intentionally vague in answering participant questions. For instance, if he was asked "Is this really a study?" he responded by saying "The answer to that

question should be evident and I will say nothing further on the matter." See Appendix G for an outline of the case officer script.

All participants were met where they waited and escorted to another floor where they took the polygraph examination. Most participants were met and escorted by an armed uniformed Federal Protection Service guard. In a few instances scheduling conflicts occurred and participants were met by a study collaborator dressed in business attire. This occurred for both deceptive and nondeceptive participants. Participants were escorted to a waiting room where a collaborator (not the guard) asked them to complete a questionnaire (see Appendix H). The questionnaire asked if they had violated national security during the project and if there was any reason their fingerprints would be on a specific floor of the building (the floor of the theft). Participants who answered affirmatively to these questions were not permitted to proceed. Participants who answered the questions negatively were asked to wait and the collaborator notified a PDD examiner that a participant was waiting for them.

The PDD examiner introduced himself, escorted the participant to the examination room, and proceeded with a standard TES pretest (see Appendix I). The examiner asked the participant to read and sign a standard "consent to interview with polygraph" form (see Appendix J), then completed a biographical and medical questionnaire (see Appendix K). The final decision regarding a participant's suitability for testing was made by the examiner. If an examiner determined that the participant was unsuitable for testing then the examination was terminated and the participant was debriefed, paid, and released.

Examiners then explained the PDD examination instrument, sensors, and procedures. The sensors were attached to the participant and an acquaintance PDD test (i.e., a known solution 'numbers' test) was conducted to demonstrate the PDD examination process.

(b)(3):10 USC 424

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The examiner administered an MGQT examination A which included three question series, printed the data, and evaluated responses by completing a AF-MGQT evaluation sheet (b)(3):10 USC 424

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11

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(b)(3):10 USC 424

Four examiners tested participants during the first two weeks of the study, then returned to their normal duties. Four different examiners tested participants during the second two weeks, then returned to their normal duties. When each two week testing session was completed the examiners were debriefed regarding the procedures and rationale for the study, the overall accuracy of the group, and their individual accuracy rate.

Data Reduction and Analyses

The quality control officer's decisions were final. There were three occasions where the procedure was not followed and the examiner proceeded with a repetition examination without conferring with the quality control officer. In all three cases, the quality control officer designated the first examination result as conclusive and the results of the second examination were discarded.

Accuracies for the TES and MGQT examinations were tabulated as follows. If a SR decision was made during the final TES subtest A or TES subtest B question series, then the participant was designated as deceptive to the TES. If a SR decision was made during the final MGQT examination A or B, then the participant was designated as deceptive to the MGQT. In the absence of a SR decision, if a NO decision was made during the final TES subtest A or TES subtest B question series, then the participant was designated as NO to the TES. If a NO decision was made, in the absence of a SR decision during MGQT examination A or B, then the participant was designated as NO to the MGQT. If the decision regarding the final TES subtest A and subtest B was No Significant Responding (NSR), then the participant was designated as nondeceptive to the TES. If the decision regarding the final MGQT

examination A and final MGQT examination B was NSR, then the participant was designated as nondeceptive during the MGQT.

(b)(3):10 USC 424;(b)(7)(E)

Analyses were calculated using Systat for Windows (version 9.0, SPSS Inc., Chicago, IL) or a proportion test (Bruning & Kintz, 1987). A significance criterion of .05 (two-tailed for proportion and ANOVA tests) was used for all analyses.

Results

(b)(3):10 USC 424;(b)(7)(E)

correctly identified using the MGQT. Alternatively, three nondeceptive participants that were correctly identified using the TES were not correctly identified using the MGQT (1 was an error and 2 were NO).

Table 4
Frequency of Correct, Error, and NO Decisions Obtained Using the TES and MGQT Examinations

	TES			MGQT
Decision	Correct	Error	NO	Total
	Nondeceptive Group (N = 50)			
MGQT Correct	36	4	0	40
MGQT Error	1	4	0	5
MGQT NO	2	2	1	5
TES Total	39	10	1	
	Deceptive Group (N = 52)			
MGQT Correct	36	9	3	48
MGQT Error	1	2	0	3
MGQT NO	0	1	0	1
TES Total	37	12	3	
	All Participants (N = 102)			
MGQT Correct	72	13	3	88
MGQT Error	2	6	0	8
MGQT NO	2	3	1	6
TES Total	76	22	4	

Sampling Effects

A loglinear analysis of participant gender, race, and group assignment (i.e., deceptive versus nondeceptive) indicates that there were significantly more females ($N = 70$) than males ($N = 32$) tested ($X^2[1, N = 102] = 14.25, p < .05$). There were also significantly more Caucasian ($N = 77$) than African American ($N = 25$) participants tested ($X^2[1, N = 102] = 27.44, p < .05$). The group assignment main effect and all interactions were not statistically significant. Loglinear analyses were also calculated to determine if gender or race were related to decision accuracy during the TES or MGQT examinations. Because there were so few NO decisions, it was not possible to accurately calculate an analysis including NO as a variable. NO decisions were pooled with errors as incorrect for these analyses. Analysis of examiner decisions using TES examination data indicated that there were significantly ($X^2[1, N = 102] = 9.46, p < .05$) more females tested than males, that there

were significantly (X^2[1, N = 102] = 20.49, p < .05) more Caucasian than African American participants, and that there were significantly more (X^2[1, N = 102] = 13.69, p < .05) correct (N = 76) than incorrect decisions (N = 26). No statistically significant interaction effects were obtained in the loglinear gender by race by decision accuracy analysis (using the TES examination). That is, examiner decisions were not influenced by gender or race. Analysis of examiner decision accuracy using the MGQT examination indicated that there were significantly (X^2[1, N = 102] = 3.93, p < .05) more females tested than males, that there were significantly (X^2[1, N = 102] = 15.67, p < .05) more Caucasians than African Americans, and that there were significantly more (X^2[1, N = 102] = 33.26, p < .05) correct (N = 88)than incorrect decisions (N = 14). No statistically significant interaction effects were obtained in the loglinear gender by race by MGQT decision accuracy analysis.

Group (i.e., deceptive and nondeceptive) by decision (i.e., correct, error, NO) analyses of variance were calculated for participant age, hours of sleep prior to test, and examination duration to determine if these variables were related to decision accuracy. Separate analyses were calculated for TES and MGQT veracity decisions. Participants were, on average, 37.35 years old (SD = 13.14). There were no significant age differences as a function of group assignment, decision accuracy, or group assignment by decision accuracy for the TES or MGQT examinations. Participants slept an average of 6.82 hours (SD = 1.47) prior to testing. There were no significant sleep differences as a function of group assignment, decision accuracy, or group assignment by decision accuracy for the TES or MGQT examinations. On average the time between participants' entry into the polygraph test room and completion of the examination was 3.34 hours (SD = .75). There were no statistically significant examination duration differences as a function of group assignment or group assignment by decision for the TES and MGQT examinations. Examination duration did not differ as a function of MGQT examination decision accuracy, but did differ significantly as a function of TES decision accuracy (F[2,96] = 8.02, p < .05). Pairwise comparisons indicate that the examinations of participants receiving NO decisions (N = 4, M = 4.73, SD = .38) were significantly (p < .05) longer than those receiving correct (N = 76, M = 3.20, SD = .70) and erroneous (N = 22, M = 3.53, SD = .68) decisions following the TES examination.

The eight examiners completed an average of 12.75 (range = 11 to 15) examinations over a two week period. Chi-square analyses of the data in tables 1 and 2 indicate that there were no statistically significant differences among the frequency of correct decisions made by examiners using TES (X^2[7, N = 102] =

4.28, $p < .05$) or using the MGQT ($X^2[7, N = 102] = 1.80, p < .05$). (NO decisions were also categorized as errors for these analyses.)

(b)(3):10 USC 424

Debriefing Results

Participant responses to yes-no and multiple-choice questions asked during the debriefing were quantified (see Appendix Q). The

18

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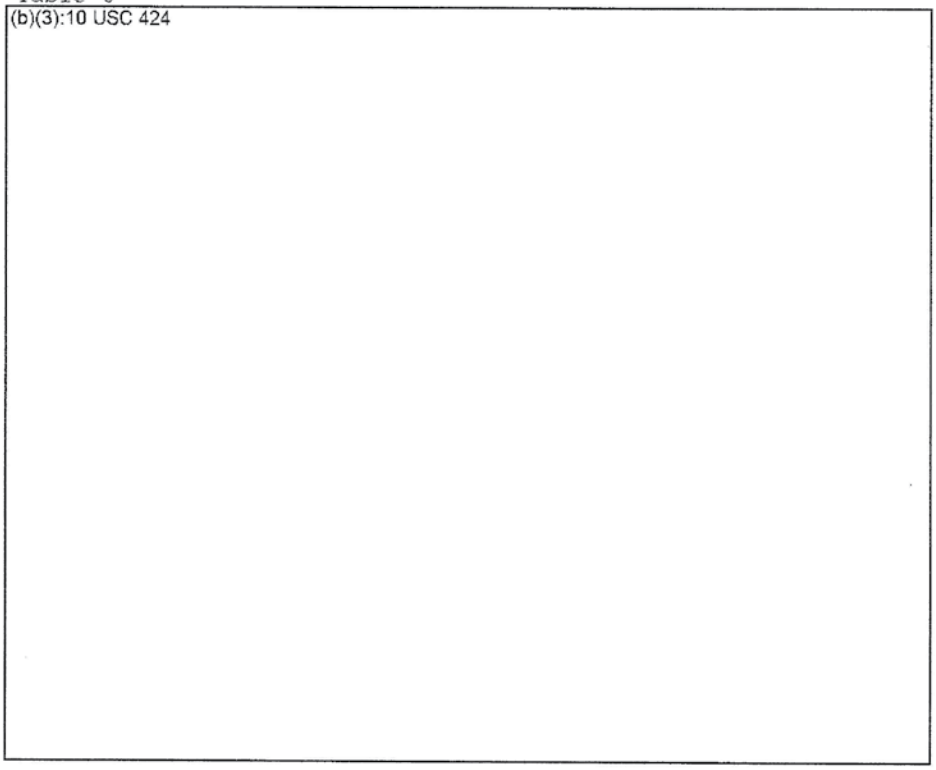
cell sizes were too small for meaningful inferential analyses. In response to the question, "Did the mock spy scenario seemed real to you at times?" 61% of the deceptive participants answered yes, 35% answered no, and 4% were not sure. Seventy-seven percent of the deceptive participants indicated that the part they played was very exciting, 19% indicated that it was somewhat exciting, 2% indicated that it was not exciting, and 2% indicated that it was too exciting.

Table 6



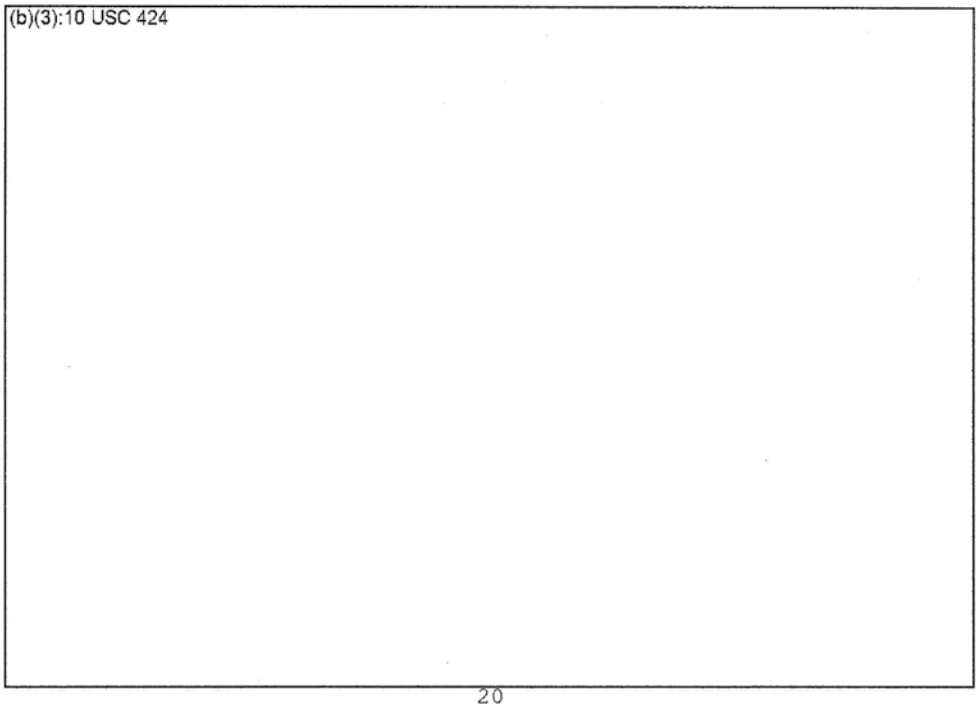
Half of the deceptive participants (50%) believed the PDD examiner detected their deception, 31% were not sure, and 19% believed the examiner had not detected their deception. Seventy-two percent of the nondeceptive participants believed they were found truthful to the relevant questions, 6% believed they were found deceptive, 12% were not sure, and 10% were not asked the question.

Fifty-two percent of deceptive participants did not believe they could defeat the polygraph, 35% believed they could, and 13%

were not sure. Seventy-five percent of the nondeceptive participants did not believe they could defeat the polygraph, 14% believed they could, 4% were not sure, and 8% were not asked the question.

The percentage of deceptive participants answering: not at all, not very, moderately, and extremely when asked how effective the $200 bonus was in motivating them to complete the project was 6%, 31%, 35%, and 29% (e.g., values are rounded), respectively. The percentages of nondeceptive participants responding: not at all, not very, moderately, and extremely to the same question were 10%, 32%, 40%, and 18%, respectively.

Forty percent of nondeceptive participants and 33% of deceptive participants indicated that they had unintentionally made hidden movements during the examination. Two percent of nondeceptive participants and forty-two percent of deceptive participants indicated that they had tried to intentionally create reactions during the polygraph examination. When asked if they had taken any medication that they had not previously reported, all said no. A few, however (2 deceptive and 4 nondeceptive participants) admitted they had forgotten to mention drinking coffee, tea, or smoking a cigarette.



20

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Discussion

Decision Accuracy

Analyses indicate that decision accuracy for both the TES and MGQT examinations was significantly better than chance. (b)(3):10 USC 424

(b)(3):10 USC 424

(b)(3):10 USC 424 Statistical power analyses indicate that a sufficient number of participants were tested to ensure that these results are representative of the sampled population.

The average correct decision rate reported for the TES examination in this project (74.5%) is lower than those reported in earlier DoDPI Research Division Staff (1997, 1998) studies (i.e., 84.8% and 91.5%, respectively). (b)(3):10 USC 424

(b)(3):10 USC 424

22

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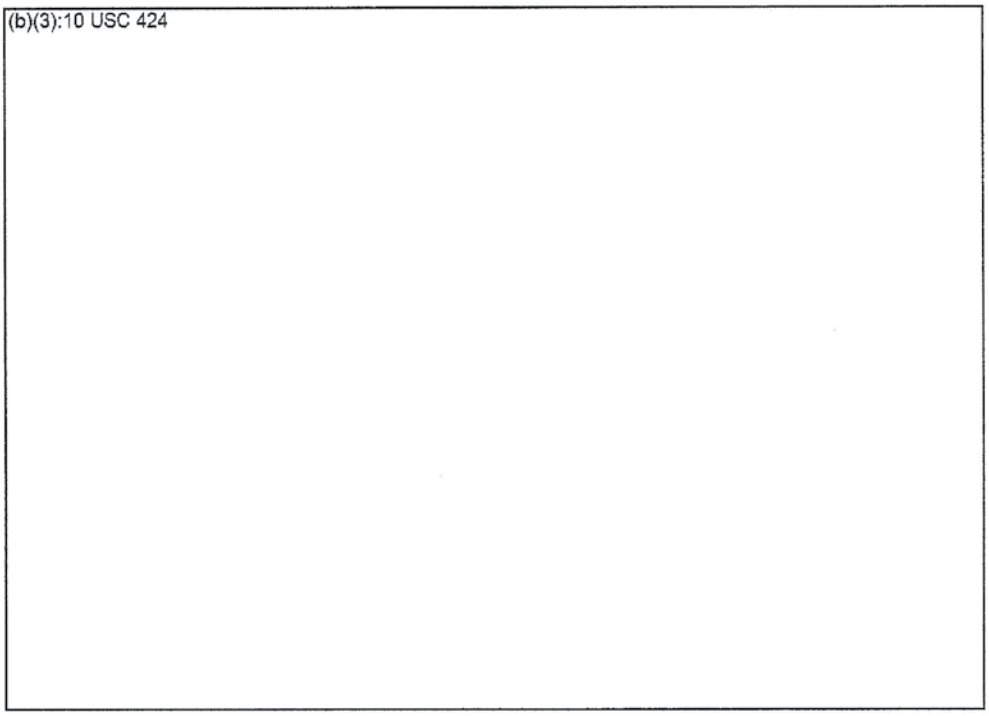

As an aside, nondeceptive participants did not receive a treatment equivalent to the mock spy scenario. While this may be considered a breach of experimental design, it was intentional. In the real world, which this project was designed to simulate, an individual taking a counterintelligence polygraph screening examination typically does not know what to expect when arriving for a first examination. A spy would, on the other hand, be attempting to conceal acts and would know what to expect during the first counterintelligence polygraph screening examination. These were the conditions the research was designed to simulate.

Sampling Effects

Analyses indicate that the frequency of correct decisions made by examiners did not differ for the TES or MGQT examinations. The number of examinations completed by each examiner was small and varied somewhat among examiners. The accuracy of examiners was, however, consistent-both individually and as a group. It is thus unlikely that decision accuracy was skewed by examiner ability differences.

There were significantly more females tested than males and more Caucasians tested than African Americans. Analyses indicate

that decision accuracy did not, however, vary as a function of participant gender, race, or group assignment. Neither age nor amount of sleep prior to testing varied as a function of decision type or group assignment. It is thus unlikely that decision accuracy was influenced by the sampling factors of participant age, race, gender, group assignment, or sleep prior to testing.

During the study there were marked differences in examiner style. While presenting the same information, some examiners would spend more time than others building rapport with participants, some would review questions in greater detail than others, some examiners seemed perfunctory during the examinations. The $\underline{X}^2$ analysis indicates that there were no significant differences among examiner decision accuracies. These style differences might, however, be reflected in the relationship between decision accuracy and examination duration. Examination duration was crudely quantified as the time between a participant's entry into the polygraph test room and completion of the examination. No statistically significant main or interaction effect differences were found among the MGQT examination durations as a function of decision accuracy or group assignment. Examination duration did change significantly as a function of TES examination decision accuracy. TES examinations resulting in a NO decision were significantly longer than those resulting in a correct or incorrect decision. This effect may, however, have been a product of the experimental design, which required examiners to repeat NO decision question series, making those examinations longer than others. The significant effect may also have been an artifact of sample size differences. Four NO decisions were obtained using TES while there were 76 correct and 22 incorrect decisions, at least a five fold difference among group sizes. It is somewhat surprising that a significant effect was found for the TES, but not for the MGQT examination decisions. A more accurate data reduction process (e.g., pretest duration or statement content analysis) might be useful in determining optimal examiner style, if one exists.

(b)(3):10 USC 424

(b)(3):10 USC 424

External Validity

It is generally believed that results from laboratory PDD studies do not generalize to field PDD testing because the jeopardy in the two situations is different (Ekman, 1992; Iacono, 2000; Iacono & Patrick, 1987; Office of Technology Assessment, 1983). Individuals taking actual polygraph examinations always benefit by passing the examination. Sometimes the benefit can be substantial, such as qualifying for a new position or avoiding incarceration. Individuals participating in a laboratory experiment do not, usually, experience the same magnitude of jeopardy or benefit. To increase jeopardy and realism, the procedures successfully used in specific issue testing by Podlesney (1976) and Kircher (1983) were adapted to a screening paradigm. The participant treatment procedures used in this study were, thus, designed to simulate the jeopardy that occurs during actual testing. Participants' uncertainty regarding whether they were participating in a research study or being duped into committing espionage was increased by (a) soliciting participants via classified advertisement and telephonic communication (b) providing only written and tape-recorded instructions prior to the PDD examination, (c) providing no direct contact with known study personnel prior to the PDD examination, (d) instructing participants to have an alibi ready and to avoid leaving fingerprints, and (e) instructing telephonic interviewers and the collaborator acting as a foreign case officer to answer questions regarding the project ambiguously. A sizable bonus of $200 was also promised, and paid, to increase participant's perception that they would lose something if found deceptive during the PDD examination. Debriefing results indicated that 61% of the deceptive participants believed, at times, that the mock spy scenario had seemed real to them. Seventy-seven percent of the deceptive participants responded that the part they played was very exciting.

Experimenters' also observed reactions which suggest, anecdotally, that participants believed the experiment to be more

25

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than a "lab study." One study participant called and told the principal investigator that she was dropping out of the study saying "I just don't trust the government enough to do something like that." Three deceptive group participants took over 40 minutes to review instructions and appeared, on closed-circuit video, to be upset. A study collaborator entered the room and found the participant crying in each case, reportedly because they believed themselves to be honest individuals and didn't want to participate in the mock spy scenario. In each case, the collaborator explained that this was a research project, that some people chose not to participate because of the deception, complimented them on their honesty and integrity, answered their questions, paid, and released them. One pilot study participant said, during debriefing, that he had called an FBI hot line to report that "something fishy was going on" at the test site. Someone identifying themself as an FBI agent called the DoDPI receptionist the next day (the phone number was included on the participant consent form) to verify that a Dr. Dollins actually worked at the Institute. While anecdotal in nature, these observations further suggest that participants were emotionally involved in the project.

These anecdotes are interesting and suggest that the testing procedure may have been stressful, but do not justify equating events in this laboratory study with the circumstances of testing in a national security setting. We suggest two approaches to resolving this problem. If data collected in the laboratory and field settings are, somehow, different, then one would expect the physiological activity measured from the examinees to reflect that difference. This question could be resolved by (a) determining how accurate examiners are at identifying if physiological data are from a laboratory or field examination or (b) comparing physiological responses from laboratory and field examinations to determine if and how they differ. Two studies have been published that compare laboratory mock crime data to field data. Kircher, Raskin, Honts, and Horowitz (1988) report that no significant differences were found between laboratory and field subjects in relative strength of reactions to control and relevant questions, but caution against generalizing from the laboratory to the field because of differences in the shapes of response profiles associated with deception to relevant questions. Pollina, Dollins, Senter, Krapohl, and Ryan (2001) found differences between data collected in the field and laboratory, but no statistically significant difference in veracity classification for the two data sets using logistic regression analysis. Neither of these studies examined screening data. We could locate no reports describing examiner classification of data as originating in the laboratory or field. Both types of study, with screening PDD examinations, would

be helpful in determining the validity of generalizing from the laboratory to the field.

(b)(3):10 USC 424

Numerous studies have demonstrated that the original examiners are more accurate than examiners who blindly evaluate the physiological data (see Iacono, 2000). Accuracy during this project could, thus, be inflated because it is based on the evaluation of the original examiner, and the QC who conferred with the original examiner. While the QC did not interact directly with the participant, he did interact with the original examiner, and could have been influenced by original examiner comments. In addition, the same examiner collected all of the data for a participant. That is, the examiner administering the MGQT examination also administered the TES examination. It is possible that the TES examination results influenced the examiner's administration or interpretation of the MGQT results. It is also possible that the difference between blind evaluator and original examiner accuracy is due to experimental procedure. Examiners in blind scoring studies are typically given some number of examinations to evaluate within a set time period. This procedure is obviously different from the original examiner's situation, where one or two examinations are administered, and evaluated, per day. Blind evaluators may be less accurate than original examiners because of task monotony. Systematic investigation of blind versus original examiner accuracies could resolve this issue and improve future experimental designs.

27

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Summary

Results indicate that decisions obtained using the counterintelligence screening polygraph process as it is used in the field, the TES examination, and the MGQT examination were significantly better than chance in correctly identifying deceptive and nondeceptive participants. Decision accuracy for deceptive versus nondeceptive group participants did not differ for any of the methods examined. Although the greatest accuracy was obtained using only the results of the MGQT examination, it would be inappropriate to conclude that the MGQT is more accurate than the TES examination because the examinations differ in scope and purpose.

(b)(3):10 USC 424

The data collected during this project were relatively free of bias in that decision accuracy did not vary as a function of participant gender, race, age, or the number of hours slept prior to testing. While the number of examinations completed by each examiner was relatively small, examiner accuracy was consistent suggesting that the data were not skewed by examiner ability differences.

An important question that is not conclusively addressed in this report is the external validity of the paradigm, or whether the results will generalize to field testing. The laboratory versus field jeopardy question can be addressed by comparing physiological responses obtained in the laboratory to those from the field. Other issues such as the importance of examiner style, the importance of posttest interviews, and the reduction of experimental confounds should be resolved as experimental procedures become more sophisticated.

28

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Appendix A

Classified Advertisement

Polygraph Study
Individuals needed. Salary is $10 per hour for up to 15 hours and the potential to earn a bonus of $200. Call XXX-XXX-XXXX for info.

Appendix B

Initial Instructions to Participants

There is an envelope on the desk with your name on it. The envelope contains a four page Informed Consent Form. The Consent Form explains what you can expect to happen during this project and describes the rights you have and benefits you can receive while participating in this project. You must complete and sign one copy of the Informed Consent Form. Leave the signed consent form on the desk when you go. The Informed Consent Form **COPY** is for you to keep if you wish. Please put your **COPY** of the form in the envelope and seal the envelope. Please leave your **COPY** of the consent form in the envelope until you leave this building. After you finish signing the Informed Consent Form, press play on the tape recorder to hear your instructions.

35

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Appendix C

Informed Consent Form 1
(DoDPI01-P-0001)

NOTE: Each form was labeled **USC IRB APPROVAL 12-21-00-07-27-01**

Current Date (M/D/Y):____/____/____ Participant #:_____

Name:_____ SSN:_____

Date of Birth (M/D/Y):___/___/___ Place of Birth:_____

Home Address:_____

_____

Home Phone Number:_____

This form is affected by the Privacy Act of 1974.
AUTHORITY: 10 USC 3013, 44 USE 3101 and 10 USC 1071-1087, and E.O. 9397.
PRINCIPLE PURPOSE: To document voluntary participation in a DoD Polygraph Institute Research Program.
ROUTINE USES: The SSN and home address will be used for identification and locating purposes. Information derived from the study will be used to document the study, decisions regarding claims, and for mandatory record keeping associated with human use in government research. Information may be furnished to federal agencies.
VOLUNTARY DISCLOSURE: Failure to furnish requested information will prevent your voluntary participation in this investigational study.

Research Project Explanation

This is a lie detection study. A lie detector test is sometimes referred to as a polygraph test or a psychophysiological detection of deception (PDD for short) examination. The purpose of this project is to test a special kind of lie detector test that is being considered for security screening within the Federal Government.

To participate in the study you must take a lie detector test. We call the people who administer these tests "examiners" or "PDD examiners." Before the test begins, the examiner will ask you to sign a standard PDD Examination Consent Form. The examiner will also review biographical and medical questions with you. The

36

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examiner will briefly review your medical history and you will be required to honestly answer questions regarding treatment by a physician, psychiatrist or psychologist and the use of drugs that could interfere with the results of the PDD examination. These questions are necessary for both your safety and to determine your suitability for participation in this project. Your answers will be confidential, as described below.

As the test begins, the examiner will explain how the test works and discuss the questions you will be asked. The examiner will then attach sensors to you. Elastic bands will be placed around your chest and stomach to measure your breathing. A blood pressure cuff will be placed on your upper arm to measure your heart activity. Two small metal plates will be placed on your fingers to measure how much your hands are sweating. These signals will tell the examiner if you are being truthful or lying. After placing the sensors on you the examiner will ask you a series of questions—which you must answer. You will be asked several series of questions throughout the afternoon.

While these measures are being recorded, you will be asked to sit still for several minutes. You may be audio or videotaped at any time while you work on this project.

Note that there are no known risks associated with psychophysiological detection of deception examinations. Some individuals do, however, find the blood pressure cuff to be uncomfortable. Some individuals are also uncomfortable with lying to a PDD examiner.

Your job is to be truthful and cooperate with the examiner. You were randomly selected to participate in this project to test a new technique. Again, your job is to be absolutely truthful to and cooperate with the PDD examiner.

If you decide not to complete the study, you may quit at any time without any penalty or punishment. If you decide not to complete the study, please call (XXX-XXX-XXXX) and tell us you are leaving so we can arrange payment. Please note that if you do quit before completing all of the testing, you will be paid only for the time you have spent up to that point, and no bonus will be awarded to you. If you have any questions or complaints concerning this study, please contact the Principal Investigator, [redacted]

(b)(3):10 USC 424:(b)(6)

PERSONAL STATEMENT

37

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I am at least 19 years old and do hereby volunteer to participate in a research study named "Screening Validation Methods: Phase 1." The project is being conducted by the Department of Defense Polygraph Institute (DoDPI) at Fort Jackson, (b)(3):10 USC 424;(b)(6)
(b)(3):10 USC 424;(b)(6)

1. I understand that I am participating in a research project that will use lie detection or psychophysiological detection of deception (PDD) examinations. I understand that the purpose of this project is to test a PDD examination that may be used for security screening within the Federal Government.

2. I understand that I will be taking a PDD examination, during which I will be asked to sit still for several minutes at a time, while physiological measurements are being recorded from my body. I am not pregnant and do not suffer blood pressure, cardiovascular, or other problems which would prevent me from comfortably sitting still for up to 5 minutes at a time.

3. I understand that I will be paid $5 per completed half hour of participation in the study. I further understand that I will also receive a bonus of $200 if I am found to be truthful during the polygraph test. I understand that I am expected to work approximately 7 hours if I complete the study. I may be asked to return for a second day of testing. I will not be allowed to use a telephone or contact people outside of the study until I have completed my participation for that day. If I choose not to complete the study I will be paid $5 for every completed half hour, but will not receive a bonus. I will receive no other direct benefits for my participation. I will indirectly receive the benefit of learning what a PDD examination is like and the satisfaction of assisting my government in protecting national security.

4. I understand that there are no known dangers or risks arising as the result of my participation in this study. The instrument used during testing, and procedures similar to those I will experience, have been routinely used within the Federal Government without incident for the last five years. I will be required to wear an inflated blood pressure cuff during the examination and I am aware that some people find the blood pressure cuff to be uncomfortable.

5. I understand that I may terminate my involvement in this project at any time and for any reason. If I do terminate my involvement I will be paid only for the time I have spent and I waive the right to any and all bonuses. I understand that if I choose not to complete the study I must call XXX-XXX-XXXX and notify personnel that I am leaving in order to receive payment. I understand that I

38

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must receive payment on the day of testing and in person. Payment will not be sent to me.

6. I understand that the PDD examination may be video and audio recorded. These recordings and all other identifying documents will be used for research purposes only and will be erased or destroyed seven years after the completion of this study.

7. I understand that my participation in this project will be terminated if I discuss the details of my participation with anyone except project supervisory personnel. NOTE: Discussion of details with the PDD examiner or other participants would invalidate the data collection.

8. I have been provided a copy of this form (marked COPY) for my reference.

9. I understand that if I have any questions, complaints, or suspect that I have sustained a physical injury during this project I should contact the Principal Investigator, (b)(3):10 USC 424;(b)(6)

(b)(3):10 USC 424;(b)(6)

Participant Signature & Date

Witness Signature & Date

Printed Name

Printed Name

39

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Appendix D

Informed Consent Form 2
(DoDPI01-P-0001)

NOTE: Each form was labeled **USC IRB APPROVAL 12-21-00-07-27-01**

Current Date (M/D/Y):____/____/____ Participant #:_____

Name:_____ SSN:_____

Date of Birth (M/D/Y):___/___/___ Place of Birth:_____

Home Address:_____

_____

Home Phone Number:_____

This form is affected by the Privacy Act of 1974.
AUTHORITY: 10 USC 3013, 44 USE 3101 and 10 USC 1071-1087, and E.O. 9397.
PRINCIPLE PURPOSE: To document voluntary participation in a DoD Polygraph Institute Research Program.
ROUTINE USES: The SSN and home address will be used for identification and locating purposes. Information derived from the study will be used to document the study, decisions regarding claims, and for mandatory record keeping associated with human use in government research. Information may be furnished to federal agencies.
VOLUNTARY DISCLOSURE: Failure to furnish requested information will prevent your voluntary participation in this investigational study.

Research Project Explanation

This is a lie detection study. A lie detector test is sometimes referred to as a polygraph test or a psychophysiological detection of deception (PDD for short) examination. The purpose of this project is to test a special kind of lie detector test that is being considered for security screening within the Federal Government.

40

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To participate in the study you must take a lie detector test. We call the people who administer these tests "examiners" or "PDD examiners." Before the test begins, the examiner will ask you to sign a standard PDD Examination Consent Form. The examiner will also review biographical and medical questions with you. The examiner will briefly review your medical history and you will be required to honestly answer questions regarding treatment by a physician, psychiatrist or psychologist and the use of drugs that could interfere with the results of the PDD examination. These questions are necessary for both your safety and to determine your suitability for participation in this project. Your answers will be confidential, as described below.

As the test begins, the examiner will explain how the test works and discuss the questions you will be asked. The examiner will then attach sensors to you. Elastic bands will be placed around your chest and stomach to measure your breathing. A blood pressure cuff will be placed on your upper arm to measure your heart activity. Two small metal plates will be placed on your fingers to measure how much your hands are sweating. These signals will tell the examiner if you are being truthful or lying. After placing the sensors on you, the examiner will ask you a series of questions—which you must answer. You will be asked several series of questions throughout the afternoon.

While these measures are being recorded, you will be asked to sit still for several minutes. You may be audio or videotaped at any time while you work on this project.

Note that there are no known risks associated with psychophysiological detection of deception examinations. Some individuals do, however, find the blood pressure cuff to be uncomfortable. Some individuals are also uncomfortable with lying to a PDD examiner.

Your job is to convince the examiner that you are being truthful. You have been randomly selected to participate in a mock crime, and then lie about what you did. We ask that you participate in a mock crime today, then return for the polygraph examination later, as scheduled. Again, your job is to convince the PDD examiner that you are being absolutely truthful.

If you decide not to complete the study, you may quit at any time without any penalty or punishment. If you decide not to complete the study, please call (XXX-XXX-XXXX) and tell us you are leaving so we can arrange payment. Please note that if you

do quit before completing all of the testing, you will be paid only for the time you have spent up to that point, and no bonus will be awarded to you. If you have any questions or complaints concerning this study, please contact the Principal Investigator, (b)(3):10 USC 424;(b)(6)

(b)(3):10 USC 424;(b)(6)

PERSONAL STATEMENT

I am at least 19 years old and do hereby volunteer to participate in a research study named "Screening Validation Methods: Phase 1." The project is being conducted by the Department of Defense Polygraph Institute (DoDPI) at Fort Jackson, (b)(3):10 USC 424;(b)(6)

1. I understand that I am participating in a research project that will use lie detection or psychophysiological detection of deception (PDD) examinations. I understand that the purpose of this project is to test a PDD examination that may be used for security screening within the Federal Government.

2. I understand that I will be taking a PDD examination, during which I will be asked to sit still for several minutes at a time, while physiological measurements are being recorded from my body. I am not pregnant and do not suffer blood pressure, cardiovascular, or other problems which would prevent me from comfortably sitting still for up to 5 minutes at a time.

3. I understand that I will be paid $5 per completed half hour for participating in the study. I further understand that I will also receive a bonus of $200 if I am found to be truthful during the polygraph test. I understand that I am expected to work approximately 7 hours if I complete the study. I understand that I will participate for approximately 2 hours on one day and return for approximately 5 hours a day or two later. I may be asked to return for a third day of testing. I will not be allowed to use a telephone or contact people outside of the study until I have completed my participation for that day. If I choose not to complete the study I will be paid $5 for every completed half hour, but will not receive a bonus. I will receive no other direct benefits for my participation. I will indirectly receive the benefit of learning what a PDD examination is like and the satisfaction of assisting my government in protecting national security.

42

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4. I understand that there are no known dangers or risks arising as the result of my participation in this study. The instrument used during testing, and procedures similar to those I will experience, have been routinely used within the Federal Government without incident for the last five years. I will be required to wear an inflated blood pressure cuff during the examination and I am aware that some people find the blood pressure cuff to be uncomfortable.

5. I understand that I may terminate my involvement in this project at any time and for any reason. If I do terminate my involvement I will be paid only for the time I have spent and I waive the right to any and all bonuses. I understand that if I choose not to complete the study I must call XXX-XXX-XXXX and notify personnel that I am leaving in order to receive payment. I understand that I must receive payment on the day of testing and in person. Payment will not be sent to me.

6. I understand that the PDD examination may be video and audio recorded. These recordings and all other identifying documents will be used for research purposes only and will be erased or destroyed seven years after the completion of this study.

7. I understand that my participation in this project will be terminated if I discuss the details of my participation with anyone except project supervisory personnel. NOTE: Discussion of details with the PDD examiner or other participants would invalidate the data collection.

8. I have been provided a copy of this form (marked COPY) for my reference.

9. I understand that if I have any questions, complaints, or suspect that I have sustained a physical injury during this project I should contact the Principal Investigator, (b)(3):10 USC 424;(b)(6)

(b)(3):10 USC 424;(b)(6)

(b)(3):10 USC 424;(b)(6)

Participant Signature & Date

Witness Signature & Date

Printed Name

Printed Name

43

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Appendix E

Recorded Instructions to Nondeceptive Participants
(DoDPI01-P-0001)

Please listen to these instructions carefully and make sure that you understand exactly what you are to do. Feel free to replay this tape if necessary. You should make a few notes to help you remember what to do as you carry out these instructions. There are writing materials next to this recorder. However, any notes that you make must be destroyed before you take the polygraph examination.

This is a lie detection experiment. You will be taking a lie detection test that is similar to one currently used by the Federal Government for security screening. You will receive a bonus of $200 in addition to the $5 per completed half hour that you are receiving for the study only if you are found truthful on the lie detector test. Therefore, it is in your best interest to be truthful during the test. Be sure to keep track of the time. When you have finished this tape recording and understand the instructions, please open the door to this room and an experimenter will meet you. The experimenter will ask you some questions. Next you will be given a lie detector test by a lie detector expert. The examiner will not know if you are truthful or deceptive. This means that the decision about your truthfulness will be based entirely on the lie detector test. You will receive the bonus only if the examiner finds you truthful. So, you must convince the examiner that you are indeed truthful. If the examiner decides, when the test is over, that you are deceptive or if the examiner can't decide whether you are truthful or deceptive, then you will not receive the bonus.

Those are your instructions. Leave all of the completed forms on the table. You must follow those instructions exactly if you are to receive the $5 per completed half hour and remain eligible to receive the bonus. If you do not wish to participate in this experiment, please call XXX-XXX-XXXX to inform us that you are terminating your participation in the study. If you are not entirely sure of what you are to do, press the 'stop' button on the tape player and then press the 'review' button. Then push the 'play' button to hear the instructions again. When you are finished, press the 'stop' button. Make sure to destroy any notes that you make before you enter the polygraph room. Again, open the door and wait for an escort as soon as you understand these recorded instructions. That is all. Please press 'stop' on the tape player now.

44

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Appendix F

Recorded Instructions to Deceptive Participants
(DoDPI01-P-0001)

Please listen to these instructions carefully and make sure that you understand exactly what you are to do. Feel free to replay this tape if necessary. You should make a few notes to help you remember what to do as you carry out these instructions. There are writing materials next to this recorder. You must conceal any notes that you take with you before you leave this room.

This is a lie detection experiment. You will commit a pretend or mock crime. You will then be given a lie detector test. If you can beat the lie detector by appearing truthful on that test, you will receive a bonus of $200 in addition to the $5 per completed half hour that you are receiving to complete this study. Note that you will only be paid for the time that you do spend in this building. Here is what you are supposed to do.

If you parked in the parking garage, put the parking ticket on this table now. If you do not leave the parking ticket you may have to pay for parking yourself. When you return to this room the ticket will be validated.

Someone needs to call you this evening to schedule a time for your polygraph examination. Write your name, phone number, and a time you can be reached between 6 and 10 tonight on the white card on this table. You will be called at the time you specify. If you do not answer the phone at that time you cannot participate in this study. Stop the recorder and complete the white card NOW. (Pause) Put the white card in the U. S. Government Messenger Envelope on this table. You will be sending the U. S. Government Messenger Envelope to Mr. Boris Mansky. Write Boris Mansky, Maintenance (spell this out) in the next empty address box on the U. S. Government Messenger Envelope. Write #___ in the STOP box next to Mr. Mansky's name. Stop the tape recorder and do it NOW. (Pause)

Take the U. S. Government Messenger Envelope and go to room _____ on the __th floor of this building. Tell the receptionist in room _____ that you have an appointment with Mr. Mark Jones. There is no Mark Jones in the building, but the receptionist is not sure of this and will have to go to another room to confirm this. When the receptionist leaves, open the door marked AUTHORIZED PERSONNEL ONLY that is connected to the receptionist's office and enter the room.

In the room marked AUTHORIZED PERSONNEL ONLY, there is a file cabinet labeled WEATHER. Search through the bottom drawer of the

file cabinet for a file folder marked Johnson Air Force Base. Open this file folder and take the contents of the file. The file contains a photograph and a diskette marked secret. Put the photograph and the diskette, along with the white card that has your name and phone number on it, in the U. S. Government Messenger Envelope. (Pause) Replace the diskette in the Johnson Air Force Base file with the diskette that is now in the U. S. Government Messenger envelope. Put the Johnson Air Force Base file folder back in the drawer. If the picture is in an envelope, leave the empty envelope in the file folder. Put the U. S. Government Messenger Envelope addressed to Boris Mansky in the Receptionist's OUT box before you leave 1451. Make sure that you wipe away any fingerprints that you may have left in the room to avoid the possibility of anyone discovering that you have been there.

Once you have done all of this, leave the room immediately so that you can get out before the receptionist returns. If the receptionist returns while you are leaving or while you are still in the file room, make sure that you have a good alibi ready so that you can explain why you were in the room and avoid getting caught. If you are forced to explain why you were in the room and the receptionist does not believe your explanation, then you will have failed to complete the mock crime and you will not be allowed to complete the study. If you do not complete the study you will have no chance to receive the bonus. Therefore, it is important that you fabricate a good excuse and have it ready in case you are discovered coming out of the room marked AUTHORIZED PERSONNEL ONLY.

Make sure that the photograph, diskette, and white card with your name on it, are in the inner envelope of the U. S. Government Messenger Envelope. Be sure to leave the envelope in the Receptionist's OUT box because there is a possibility that you and the U. S. Government Messenger Envelope could be searched by a security guard as you move through the building. Searches are done on some days by a random schedule. If you are searched and either the photograph or diskette are discovered, you will have failed to complete the theft and you will not be permitted to complete the study. Therefore, it is imperative that you leave the U. S. Government Messenger Envelope in the Receptionist's office.

After completing the theft and leaving the envelope, you should return to this room to get your parking ticket. After you get the validated parking ticket leave this building. You are finished with this project for today. If you completed the task as described, you will be contacted tonight for further instructions. You should plan to take a polygraph examination. Someone will call you tonight to set up a meeting. The man you meet will pay you $200 cash for sending him the photograph and the diskette. You will be required

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to sign a receipt for the money, so check to be sure that you are given the right amount of money. Also, make sure to give the man any notes that you have with you. The man may ask you some questions and give you some information regarding the polygraph examinations. Be sure to listen carefully to everything he says. When you and the man finish talking he will leave. You should wait in that room until you are met by an experimenter who will ask you some questions.

Next, you will be given a lie detector test by a lie detector expert. The examiner will not know if you are truthful or deceptive. This means that the decision about your truthfulness will be based entirely on the lie detector test. You will receive the bonus only if the examiner finds you truthful. So, you must actually convince the examiner that you are indeed truthful. If the examiner decides, when the test is over, that you are deceptive or the examiner can't decide whether you are truthful or deceptive, you will not receive the bonus.

Also, you must not make the examiner suspicious when you are interviewed during the initial portion of the test. The examiner does not know what you have done. If the examiner asks you questions regarding any details about your activities, you must deny knowing anything. You must do this sincerely so that the examiner doesn't become suspicious. If at some point during the test you think you blew it, don't give up. You may still be able to beat the test. However, if you admit your deception, you will receive only the $5 per completed half hour for participating in the experiment, and you will not receive the bonus.

From the time that you leave this room until the time that you arrive at the waiting area for polygraph testing, you are to communicate with no one about this project except the man who contacts you tonight. You are not to tell anyone what you are doing and you should not act suspicious or draw attention to yourself. Be sure to commit the theft as quickly as possible after leaving this room.

To summarize, you should complete the theft in room _____, return to this room for your consent form and validated parking ticket, and leave this building as quickly as possible. Make sure that the photograph and diskette you take from the Johnson Air Force Base file cannot be seen through the holes in the U. S. Government Messenger Envelope. Be sure to leave the card with your name, phone number, and a time to call you in the envelope. Also be sure to replace that diskette with the one already hidden in the U. S. Government Messenger Envelope. Finally, do not carry any notes to the polygraph test. Again, be sure to discuss this project only

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with the person who calls you tonight. If you reveal details to anyone else you will not receive the bonus.

Those are your instructions. Leave all of the completed forms and your parking ticket on the table. You must follow those instructions exactly if you are to receive the $5 per completed half hour and for the bonus. If you do not wish to participate in this experiment, please call XXX-XXX-XXXX to inform us that you are terminating your participation in the study. If you are not entirely sure of what you are to do, press the 'stop' button on the tape player and press the 'review' button. Then push the 'play' button to hear the instructions again. When you are finished, press the 'stop' button. That is all. Please press the 'stop' button on the tape player now.

48

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Appendix H

Veracity Questionnaire
(DoDPI01-P-0001)

Current Date (M/D/Y):____/____/____ Participant #:_____

Name:_____ (please print)

1. You know you are going to be tested about violations of national security. Have you violated national security during this project?

2. Is there any reason why your fingerprints should be on a file cabinet on the 14th floor of the Strom Thurmond building?

3. How do you think the polygraph test will come out on you today?

4. How do you feel about taking the polygraph test?

51

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Appendix J

PDD Examination Consent Form
(DoDPI01-P-0001)

CONSENT TO INTERVIEW WITH POLYGRAPH

PLACE: _____ TIME:_____

Before we begin the PDD examination you must understand your rights.

YOUR RIGHTS

YOU HAVE THE RIGHT TO REFUSE TO TAKE THE EXAMINATION.

IF YOU AGREE TO TAKE THE EXAMINATION, YOU HAVE THE RIGHT TO STOP THE EXAMINATION AT ANY TIME.

IF YOU AGREE TO TAKE THE EXAMINATION, YOU HAVE THE RIGHT TO REFUSE TO ANSWER ANY INDIVIDUAL QUESTIONS.

WAIVER AND CONSENT

I HAVE READ THIS STATEMENT OF MY RIGHTS AND I UNDERSTAND WHAT MY RIGHTS ARE. I VOLUNTARILY AGREE TO BE EXAMINED BY MEANS OF THE POLYGRAPH DURING THIS INTERVIEW. I UNDERSTAND AND KNOW WHAT I AM DOING. NO THREATS OR PROMISES HAVE BEEN USED AGAINST ME TO OBTAIN MY CONSENT TO ADMINISTER THIS EXAMINATION.

I CERTIFY THAT I AM PRESENTLY IN GOOD HEALTH AND THAT I AM NOT BEING TREATED BY A PHYSICIAN, PSYCHIATRIST, OR PSYCHOLOGIST FOR ANY PHYSICAL OR MENTAL DISORDER (EXCEPT AS LISTED BELOW). I FURTHER DECLARE THAT I AM NOT NOW BEING, NOR HAVE EVER BEEN, TREATED FOR SERIOUS DISEASES OF THE HEART, LUNGS, OR CENTRAL NERVOUS SYSTEM (EXCEPT AS LISTED BELOW).

I CERTIFY THAT I HAVE PROVIDED THE EXAMINER WITH THE FOLLOWING EXCEPTIONS: (original expanded, space here reduced to fit page)

I KNOW OF NO MEDICAL REASON WHY I SHOULD NOT UNDERGO A PSYCHO-PHYSIOLOGICAL DETECTION OF DECEPTION EXAMINATION AT THIS TIME.

_____	_____	_____
EXAMINEE	DATE (M/D/Y)	WITNESS
_____	_____	_____
PRINTED NAME	PARTICIPANT NUMBER	PRINTED NAME

74

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Appendix K

Biographical and Medical Questionnaire
(DoDPI01-P-0001)

Participant number:__ _____ Completion Date (M/D/Y) ___/___/___

This form is affected by the Privacy Act of 1974.

AUTHORITY: 10 USC 3013, 44 USE 3101 and 10 USC 1071-1087, and E.O. 9397.

PRINCIPLE PURPOSE: To document health status during voluntary participation in a DoD Polygraph Institute Research Program.

ROUTINE USES: The SSN and home address will be used for identification and locating purposes. Information derived from the study will be used to document the study, decisions regarding claims, and for mandatory record keeping associated with human use in government research. Information may be furnished to federal agencies.

VOLUNTARY DISCLOSURE: Failure to furnish requested information will prevent your voluntary participation in this research project.

Please carefully complete all of the blanks below:

Name (Please Print): _____ Gender: ( )M ( )F

Occupation: _____ Age: _____

Hours of sleep last night: _____ Race: _____

Have you taken a previous PDD Examination: ( )Yes ( )No

Have you ingested alcohol, nicotine, or caffeine (including coffee, tea, soft-drinks, and chocolate) within the last 24 hours? ( )Yes ( )No
If so, what and when? _____

How would you describe your present health and physical well being?
( )Excellent ( )Good ( )Fair ( )Poor

75

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Are you presently under a physician's care and are you taking any medication? ( )Yes ( )No

If so, for what condition? _____

Please give the type, dosage, and last time you took medication:

_____

Are you experiencing any pain or discomfort today?

( )None ( )Mild ( )Moderate ( )Severe

Reason for any pain or discomfort today: _____

_____

Please note reason(s), if examinee is unsuitable for testing:

_____

_____

_____

_____

_____

_____

_____

_____

76

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Appendix L

TES Evaluation Sheet
(DoDPI01-P-0001)

1st Presentation	R	R
Upper pneumograph		
Lower pneumograph		
Combined pneumograph		
Electrodermal		
Cardiovascular		
Subtotal		

2nd Presentation	R	R
Upper pneumograph		
Lower pneumograph		
Combined pneumograph		
Electrodermal		
Cardiovascular		
Subtotal		

3rd Presentation	R	R
Upper pneumograph		
Lower pneumograph		
Combined pneumograph		
Electrodermal		
Cardiovascular		
Subtotal		

Question Total		

Sub-Test Total	

Decision	NSR NO SR

SubTest:	**A**	**B**

Presentation:	**1**	**2**

Date:

Time:

Examiner:	**Original**	**QC**

Examiner:

Examinee #:

Comments:

77

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Appendix N

AF-MGQT Evaluation Sheet
(DoDPI01-P-0001)

Chart 1	R	R	R
Upper pneumograph			
Lower pneumograph			
Combined pneumograph			
Electrodermal			
Cardiovascular			
Subtotal			

Chart 2	R	R	R
Upper pneumograph			
Lower pneumograph			
Combined pneumograph			
Electrodermal			
Cardiovascular			
Subtotal			

Chart 3	R	R	R
Upper pneumograph			
Lower pneumograph			
Combined pneumograph			
Electrodermal			
Cardiovascular			
Subtotal			

Question Total			

Decision	NSR	NO	SR

AF-MGQT TOPIC:

Presentation: 1 2

Date:

Time:

Examiner: Original QC

Examiner:

Examinee #:

Comments:

82

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Appendix O

Debriefing Questions
(DoDPI01-P-0001)

1. In this study, did you commit a mock crime before your polygraph test?

___No (Go to question 8)
___Yes (which one)
___espionage
___sabotage
___revealing classified information to someone

2. Do you think the polygraph examiner detected your lie regarding the scenario you acted out?
___No
___Yes
___Not sure

3. Did the mock spy scenario seemed real to you at times?
___No
___Yes
___Not sure

4. To you, how exciting was the part you role played?
___Not at all
___Somewhat
___Very
___Too much

5. What could we do to make the scenario more exciting?

_____

_____

_____

6. Do you think you could defeat the polygraph examination if you wanted to?
___No
___Yes (explain how)_____

83

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7. How effective was the $200 bonus in motivating you to complete the project?
Not at all ( ) Not Very ( ) Moderately ( ) Extremely ( )

8. Would less payment have been effective? Did you think about the bonus at all during your polygraph test?

_____

_____

9. Describe your thoughts/perceptions about the case officer, scenario, Polygraph exam, Federal building.

_____

_____

_____

10. What were you thinking about during the test?

_____

_____

11. Did you make any kind of hidden movements during the examination?
___No
___Yes (what type)_____

_____

12. Did you try to create any reactions on the polygraph?
___No
___Yes (what type)_____

_____

13. Have you taken any medication today that you have not previously reported?
___No
___Yes (what type)_____

Question 14 is only for those participants who came back a second day to complete the project.

84

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14. How did you feel when you learned that you would be asked to come back a second day to complete the project?

15. Is there a real life reason why you might have responded to the questions about espionage, sabotage, contact, or disclosure?

16. Did any of the questions you were asked cause you to feel uncomfortable? If so, what were they?

17. Do you have any other comments regarding this project that you'd like to pass on to the scientists who designed it?

18. How comfortable did you feel with the examiner?
Not at all ( ) Not Very ( ) Moderately ( ) Extremely ( )

85

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19. As a condition of participation, you were requested to refrain from discussing the details of the study with anyone before April 1, when the experiment is completed. Will you discuss this study with anyone before that date?

___No. I will not discuss the study details with others before April 1.
___Yes. I intend to disclose the study details to others before April 1

_____ Signature

_____ Date

86

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NOTE, Debrief participant on the following topics:

No actual illegal acts were performed

The participant has committed no crime and is truly innocent of espionage, sabotage, unauthorized disclosure, and unauthorized contact with a foreign national.

The security guard and receptionist were project confederates.

Answer all of participant's questions (b)(3):10 USC 424;(b)(6) the names of (b)(3):10 USC 424 to contact should questions arise.

87

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Appendix P

For Deceptive Participants:

Debriefing Statement
(DoDPI01-P-0001)

On behalf of the entire project staff, I would like to take this opportunity to thank you for participating in this project. Your participation here today was more important than you may realize. Depending on the results of this study, we may be able to significantly change current procedures; making security examinations simpler and more accurate.

We would like to assure you that you in no way violated any rules or laws. The activities were strictly for the purpose of deceiving the examiner. We want to emphasize that you have broken no laws and performed no illegal acts. Please return the $200 to the person presenting you with this form and they will sign below to indicate that the money was received. You should keep this form for a few days, in case there are any questions.

We hope you enjoyed your participation. We hope you were not made uncomfortable in any way. (b)(3):10 USC 424;(b)(6)

(b)(3):10 USC 424;(b)(6)

We ask that you please do not discuss what you did here today, with anyone. Many people from the community will be participating in this project, perhaps relatives or friends of yours. It is very important that they do not have any prior information regarding the project. Knowledge of the study might seriously damage the results of this project. Thank you for your understanding and cooperation.

I received $200 from:

_____

_____ _____
Project Representative Date

88

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For Nondeceptive Participants:

Debriefing Statement
(DoDPI01-P-0001)

On behalf of the entire project staff, I would like to take this opportunity to thank you for participating in this project. Your participation here today was more important than you may realize. Depending on the results of this study, we may be able to significantly change current procedures; making security examinations simpler and more accurate.

Your role in this project was very important. No detection of deception format is useful if it improperly identifies truthful people as deceptive.

We hope you enjoyed your participation. We hope you were not made uncomfortable in any way. (b)(3):10 USC 424;(b)(6)

(b)(3):10 USC 424;(b)(6)

We ask that you please do not discuss what you did here today, with anyone. Many people from the community will be participating in this project, perhaps relatives or friends of yours. It is very important that they do not have any prior information regarding the project. Knowledge of the study might seriously damage the results of this project. Thank you for your understanding and cooperation.

_____

_____ _____
Project Representative Date

89

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TO
TRUTH