Polygraph

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POLYGRAPH EXAMINATIONS WITH INTERPRETERS

By

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Many polygraph examiners have never conducted an examination through an interpreter, but it is possible that the need to do so could arise very soon. The 1980 census showed almost four and one-quarter million United States residents who spoke English either not well or not at all. It has been said that the United States is the fourth largest Spanish-speaking country in the world.

Many examiners would not welcome the task of working through an interpreter, and some may even refuse it out of concern that they could not control the quality of the examination process without direct communication with the examinee. However, it is possible to conduct an effective examination if appropriate preparation and procedures are used.

This article addresses selection of an interpreter, and the preparation and conduct of examinations conducted verbally in two different languages. It does not cover every consideration that should be taken in other special situations such as testing deaf or otherwise handicapped individuals. For those examinations the reader might also refer to "Use of the Sign Interpreter in Testing the Deaf" by William E. Wagner, Polygraph, September 1979, and "Testing the Physically Handicapped" by Norman Ansley, Polygraph, March 1976.

WHEN IS AN INTERPRETER NECESSARY?

It is tempting to conduct an examination unaided when the examinee displays enough command of the examiner's language to "get by". The examinee should provide more information, however, through word choices and even non-verbal behavior if he communicates in his native language. Even though it is inconvenient to use an interpreter, it might prove worthwhile to do so just because it helps eliminate distracting efforts to grope for words or to ask for clarification. Interviews can proceed more smoothly, and the examiner has more control in creating and maintaining the proper emotional climate.

The most important function of the interpreter, however, is to insure the communication between examiner and examinee is correct and complete. Even when highly educated people discuss a matter in a common native language, there is likely to be some degree of misunderstanding due to many factors, including:

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- limited experiences and vocabularies of the participants;

- imprecise and multiple meanings for many words which exist in all languages;

- confusing inflection, tone, and body language messages; and

- cultural or regional differences among the participants.

Proper communication is necessary because the discussions that take place during a polygraph examination require more depth of understanding of language than is required in most other situations. Questions asked during the in-test phase of the examination, although simple, direct and concise, are the result of sophisticated selection of words based on experience and understanding of semantics and nuance. In order to conduct an effective examination, it is also important that the truthful subject not have his anxiety heightened, or that the deceptive subject not feel relief, through the possibility of misunderstood communications.

There is no one way of translating any word or thought between languages, and the most literal translation is not necessarily the best. Therefore, the interpreter must evaluate the speaker's meaning and attempt to relay that same meaning to the listener. In her book Meaning-Based Translation: A Guide to Cross-Language Equivalence, Mildred Larson defined the process as follows:

> Translation consists of studying the lexicon, grammatical structure, communication situation, and cultural context of the source language text, analyzing it in order to determine its meaning, and then reconstructing this same meaning using the lexicon and grammatical structure which are appropriate in the receptor language and its cultural context.

Every polygraph examination is a serious matter, and the outcome is of importance to the examinee, the professional examiner, and the agency or client that requests the test. Because of the importance of the matter and vagueness of language, an interpreter should be used whenever the examiner has reason to question the examinee's ability to adequately comprehend and represent himself using the examiner's language, while possibly being more capable in another, more familiar language.

SELECTION OF AN INTERPRETER

The interpreter must possess certain qualities, the most obvious being fluency in both languages. He must be intelligent and educated in order to assure his understanding or vocabularies and to convey the impression of competence to the examinee. He must not display any personal, physical or speech traits that would

be distracting or that might otherwise adversely affect the climate that the examiner wants to create. It would be helpful if the interpreter has experience in interpreting and feels comfortable in the role. He may feel challenged enough entering the polygraph situation for the first time without also being concerned about learning how to function as an interpreter.

A qualified professional interpreter should be employed. By doing so you are not only assured of excellent language ability, but the professional interpreter is experienced in routinely and unobtrusively providing correct meaning between the parties without being a third party to the discussion. This makes the examiner better able to create and maintain the desired spontaneity and emotional climate. Use of a professional interpreter also lends credibility to the decision/outcome of the examination by eliminating questions about interpreter competence and the examinee's understanding of what was said during the examination.

Sometimes the agency or client that requests the examination will offer an employee for interpretation who is described as able to speak "fluently" in the examinee's language. This could be helpful because of familiarity with case facts or unique terminology. For instance, an interpreter with a law enforcement background may be familiar with information obtained during an investigation, evidentiary requirements and interview-interrogation techniques. However, the examiner cannot be certain of the interpreter's ability with the second language, nor that intended meanings are being effectively conveyed. Also, amateur interpreters tend to participate in the process beyond merely assisting with the language, which takes away some of the examiner's control of the session.

Some examiners prefer an interpreter of the same gender as the examinee to reduce distraction and make the examinee more at least to discuss emotional issues. Realistically, however, you may settle for whoever is available and competent.

If there are concerns about the competency of a particular interpreter, measures should be taken to try to verify that at least minimal expectations will be met. These measures should include the following:

- Inquire with attorneys, investigators and other polygraph examiners who might be aware of the interpreter's abilities. The inquiries should include people familiar with the languages to be used and the nature of polygraph examinations.

- Draft questions similar to those expected to come up in the examination and read them aloud to the interpreter while he writes a second-language version of the questions. Later, have the interpreter read his written version while giving a simultaneous

oral translation into the examiner's language. Evaluate the translation and discuss the results with the interpreter. Enough time should elapse between the two interpretations to preclude verbatim memory by the interpreter.

There are several ways to locate a professional interpreter. If the examination is part of a federal matter, the Department of State will assist by providing a staff or contract interpreter. These interpreters have passed proficiency tests and a background investigation. They are utilized in all types of meetings and conferences, some requiring the highest levels of confidentiality. The federal agency requesting assistance must pay a daily fee for the service plus travel costs, if any. Inquiries should be made to:

U.S. Department of State, Interpreting Division
Office of Language Services, Room 2212
2201 "C" Street, N.W.
Washington, D.C. 20520-2204
Telephone: 202-647-3492

The American Association of Language Services (TAALS) has a membership of private professional interpreters located nearly worldwide, and requires a high standard of ethics and performance within the membership. Much of their work involves conference interpreting, therefore, some unusual language-pairs may not be available within their membership because of the lack of international conferences between certain countries. The members charge a fee, currently about $400 per day, plus travel expenses. TAALS has a listing of members' geographic locations and working languages, and a member may be able to refer a qualified non-member interpreter in your area if necessary. Inquiries should be made to:

The American Association of Languages Specialists
1000 Connecticut Avenue, N.W., Suite 9
Washington, D.C. 20036
Telephone: 301-986-1542 (Washington)
212-865-0183 (New York)
416-977-8588 (Canada)

Another source of information about qualified interpreters could be a United States District Court, where interpreters are used frequently. Most federal courts will only have Spanish-English certified interpreters, those that passed a formal proficiency test, but may also know of competent interpreters of other languages.

Many cities have interpreters listed in the Yellow Pages, and Yellow Pages may also list language schools or universities that might provide referrals.

PREPARATION FOR THE EXAMINATION

A day or more prior to the examination, the examiner should give the interpreter brief instruction about polygraph theory and procedures. This instruction should include the following:

- Function of the polygraph instrument;

- Psychophysiological theory of polygraph examination;

- Rules for question formulation;

- Definitions of technical terminology likely to be used; and

- Principles involved in conducting the examination, such as consistent tone while phrasing questions, noting any poorly worded questions, etc.

The examiner and interpreter should discuss and decide on what interpretation methods will be used, such as microphone and earphone vs. the unaided voice, and simultaneous interpretation vs. consecutive (with breaks between phrases). The examiner must recognize and respect the knowledge and experience of the interpreter, and provide for his requirements to do an effective job.

Prepare translated versions of any forms you require examinees to read or sign, such as consents, waivers or Fifth Amendment advice. Review these with the interpreter to verify they are complete and correct in meaning and tone.

Make sure the interpreter understands the meanings of technical terms that are likely to arise relating to polygraph technique and any unusual terms unique to the particular examination. There may not be words in the second language for a literal translation of unique terms, and the interpreter must understand definitions in order to produce equivalent terms.

The interpreter must be made to understand how important it is that he be very complete and precise in interpreting the examinee's statements. As A.H. Burdick said in "Use of an Interpreter During a Polygraph Examination", Polygraph, December 1973, there is a profound difference between "I never saw that missing jewelry" and "I never saw all that missing jewelry." If you use an amateur interpreter, you must make him understand that he is to repeat only what is said by the examiner and examinee without independently pursuing a confusing point or stating his own assumptions of what the examinee means.

Instruct the interpreter about dress requirements and his demeanor during the examination. He is to remain neutral in every respect, and is to avoid any expression of emotions through

language, gestures or facial expression. The examiner's demeanor, whether sympathetic, angry or whatever, will be noticed by the examinee without the interpreter trying to adopt the same behavior. The examiner must control many factors to create and maintain the desired psychological attitude of the examinee, and these factors include the influence that the interpreter may exert unintentionally.

A mock examination should be conducted with a volunteer examinee who speaks the second language, if such a person is available. In conducting this practice examination you will encounter problems that you may not have anticipated and prepared for which are better resolved in a practice situation than during the real examination. The mock examination will allow both examiner and interpreter to feel more at ease and confident, which will in turn have a favorable effect on the examinee in the real test.

Prepare the examination room to suit whatever seating arrangement fits your needs. If microphones/earphones are to be used, the interpreter should sit well off to the side during pretest and post-test interviews. If no audio equipment is used, the interpreter should sit closer, but certainly not between the examiner and examinee. People have a natural tendency in a small group to turn their bodies toward the middle and invite everyone into the conversation. Since the interpreter is not to be a "participant" in the discussion, the examiner and examinee should sit facing each other and close enough together that the interpreter does not exert a physical presence in the conversation exchange. It may be helpful for the interpreter to sit next to the examinee so the examinee cannot speak to him without having to turn to his side.

The examiner should make a list of questions that might be asked during the examination so the interpreter can have time to translate them prior to the examinee's appearance. This will allow time for discussion of whether the translation fits the examiner's needs, and it will save time during the actual examination. Of course actual relevant and control questions cannot always be determined beforehand, but it is usually possible to anticipate approximate question wording. Several appropriate control questions should be translated and ready for use. If it is necessary to revise the anticipated questions because of events of the pretest interview, the examiner and interpreter should discuss the changes outside the presence of the examinee. A question sheet must be prepared in the second language with questions numbered the same as the examiner's version. Instruct the interpreter to read the questions from the sheet during the examination using precisely the same words each time.

CONDUCTING THE EXAMINATION

Even though it may be the examiner's first and only experience with an interpreter, the examinee should be made to feel that it is not an unusual situation. As with any other examination, the examiner should give the impression of knowledge and competence. Any uncertainty shown by the examiner can adversely affect the confidence level of the examinee.

At the beginning of the examination the examinee should be introduced to the interpreter, but instructed that the interpreter's only purpose is to assist with the language and that all statements and questions should be directed to the examiner. The examiner, of course, must be careful to direct his remarks to the examinee and refrain from frequent eye contact with the interpreter, which would be a signal that the interpreter is actually a party to the conversation.

Have the interpreter read the prepared forms to the examinee. If any questions or remarks arise, the interpreter will not answer them directly, but is to interpret them to the examiner who will provide the response.

At some point the examinee will invariably start directing his conversation to the interpreter, perhaps in attempt to make sure his position is adequately explained, or perhaps to gain the interpreter's belief of his honesty. Whenever this happens, the examiner should look at the examinee and say "Look at me!" or "Talk to me!" If the examinee starts a conversation with the interpreter out of politeness or curiosity, the interpreter should advise the examiner and not independently carry on the conversation. The examiner should tactfully either allow very brief completion of the matter, or reassure the examinee of the interpreter's capabilities and instruct him to wait until completion of the examination to talk further about it.

Often the examinee will understand English (assuming English is the examiner's language) to some degree and will respond to the examiner's questions before hearing the interpretation. The interpreter should translate anyway to make sure the examinee has the opportunity to completely understand what the examiner says.

If the examinee begins to speak in English, the interpreter will not repeat what was said, but should continue to interpret the examiner's words into the second language. The examiner will have to determine how much English to allow from the examinee, and as soon as his statements begin to lack clarity he should be instructed to speak in the other language.

Strive for simplicity during the examination. Give very specific and concise instructions and explanations to the examinee.

help the interpreter by giving directions during the test so that all he has to be concerned about is translation, with as little decision making as possible about conduct of the examination. Naturally, more time is required to carry on a conversation through an interpreter than if both parties use the same language, but it is possible for an examination to go faster using an interpreter. Some examiners tend to talk more than is actually necessary, and some examinees also tend to carry on. The necessity to have each word and idea scrutinized and translated will reduce the unnecessary verbiage and may allow the examination to move along more quickly.

Conduct the instrument phase of the examination taking care to keep talking to a minimum. Both examiner and interpreter must be positioned out of the examinee's view.

The examiner will give necessary instructions while attaching and adjusting the instrument, and about movement, etc. as required during the examination, all of which will be interpreted. Advise the examinee, however, that the actual test questions will not be spoken by the examiner, nor will the examinee's responses be translated.

Prior to each test question, the examiner should locate and point to the question number on his question sheet. The interpreter will then locate that question on his prepared translation, but not begin reading the question until the examiner gives a prearranged silent signal. The examiner will note the examinee's response on the charts without interpretation. The interpreter should be made aware of the possible need to quickly switch from a planned question to an extra irrelevant question as events may dictate.

For post-test interviews, assume the same seating arrangement used in the pretest and continue in the same manner. If you anticipate a prolonged interrogation, you would obviously make sure the interpreter is prepared for it. It is a good practice to let the interpreter take a break, away from the examinee, while you evaluate charts and plan the subsequent interview.

If the situation warrants, you may want to make an audio recording of the examination and have a translated transcript made by an independent translator. This would help verify interpreter competence if it is necessary to defend the outcome of the examination, and would also prevent collusion between the interpreter and examinee.

CONCLUSION

Whenever there is a question about the language ability of an examinee you should consider whether it is appropriate to use an

interpreter. Effective polygraph examinations can be conducted through interpreters with appropriate preparation and procedures. The use of a competent interpreter can allow smoother and more complete communication between examinee and examiner, and lend credence to the outcome of the test.

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DEPARTMENT OF DEFENSE POLYGRAPH PROGRAM
Annual Report to Congress for Fiscal Year 1991

[from]

Office of the Assistant Secretary of Defense
(Command, Control, Communications, and Intelligence)

I. The Polygraph: Background Information

Scientific lie detection originated in Europe before the turn of the century. Italian criminologist Cesare Lombroso was the first to report using an instrument to detect lies. His device, a hydrosphymograph, measured changes in the amount of blood in the arm of a criminal suspect undergoing interrogation. Since then, there has been a continuing evolution in the field of psychophysiological detection of deception both in the United States and internationally.

The Department of Defense has used the polygraph effectively for almost half a century. It has been used mainly in criminal investigations, counterintelligence cases, foreign intelligence and counterintelligence operations, exculpation, when requested, and, now, counterintelligence-scope screening. The polygraph is a valuable tool which enhances the interview and interrogation process. Often it is the only investigative technique capable of providing answers to essential questions needed for resolution of national security issues and criminal investigations.

In the past, the polygraph was viewed as a technical device used by skilled technicians who had been given vocational-type training. As long as the technicians followed a specified procedure, the examinations were considered valid. Beginning in 1987, the Department of Defense initiated a shift toward an academic and scientific model, in which the polygraph procedure is viewed as an emerging scientific discipline known as forensic psychophysiological detection of deception.

To develop this new discipline, the Department of Defense Polygraph Institute is substantially upgrading its curriculum and producing a Master's-level program for psychophysiological detection of deception examiners. This includes covering a much broader range of conceptual, abstract and applied knowledge associated with our parent disciplines: psychology and physiology. This combined knowledge, as it relates to criminal, intelligence, and counterintelligence work, is called forensic psychophysiology.

This is the complete text of the report. However, Appendix B with examples of how the polygraph was used in FY 1991 has been deleted. Reproduction of this report was authorized by David V. Keene, Deputy Director for Polygraph, Office of the Assistant Secretary of Defense. [Ed.]

With this in mind, the following report reflects how the Department of Defense Polygraph Program is managed, and documents specific examples of polygraph utility, with special emphasis on the Department of Defense Counterintelligence-scope Polygraph Program.

The Fiscal Year 1985 Defense Authorization Act authorized the Department of Defense to implement a Counterintelligence-scope Polygraph "test program" restricted to 3,500 examinations. This restriction did not affect Department of Defense use of the polygraph in criminal investigations or any other use authorized by Department of Defense policy that existed as of 1 August 1982. The test program was structured to address persons who: 1) required access to specifically designated information within a Special Access Program; 2) held Critical Intelligence Positions within the Defense Intelligence Agency; and 3) required emergency interim access to Sensitive Compartmented Information.

The Counterintelligence-scope Polygraph Program was continued by Congress for fiscal years 1986 and 1987 with restrictions of 3,500 and 7,000 examinations, respectively. Congress specifically exempted, from the numerical restrictions, those individuals assigned or detailed to the Central Intelligence Agency or the National Security Agency and individuals assigned to positions where cryptographic information is stored, processed, or produced.

In fiscal year 1988, Congress granted the Department of Defense permanent authority to administer counterintelligence-scope polygraph examinations subject to a numerical restriction of 10,000 each year for fiscal years 1988 through 1990 and 5,000 for fiscal year 1991 and the outyears. Congress also added individuals involved in the collection of specialized national foreign intelligence through reconnaissance programs to the aforementioned exemptions.

The purpose of the Counterintelligence-scope Polygraph Program is to deter and detect espionage. The counterintelligence-scope polygraph examination questions focus on whether the examinee has ever engaged in espionage or sabotage; has ever given or sold any classified materials to unauthorized persons or been approached to do so; has ever had any unauthorized contact with a representative of a foreign government; or has ever had any knowledge of anyone who has been involved in the above.

II: Fiscal Year 1991 Counterintelligence-Scope Polygraph Examinations

The following information is provided in accordance with section 1121 of Public Law 100-180, 101 Stat. 1147.

(1)	Special Access Programs	3,794
(2)	DIA Critical Intelligence Positions	639
(3)	TOP SECRET	554
(4)	Examinations for Interim Access to Sensitive Compartmented Information	5
	Total Examinations Conducted Under the Congressional Ceiling	4,992
	Exempted Examinations	11,336
	DoD Counterintelligence-scope Polygraph Program TOTAL*	16,328

* Note: Does not include counterintelligence-scope polygraph examinations conducted by the National Security Agency.

III: Refusals

In Fiscal Year 1991, a total of 39 persons declined polygraph testing. This figure represents a decrease from the 53 who declined the examination in Fiscal Year 1990. The two most often-stated reasons for declining the counterintelligence-scope polygraph screening examination are: 1) the examination was considered an intrusive device that violated the right to privacy; and 2) the examinee decided against a job requiring a high-level security clearance and a polygraph examination. In fiscal year 1991, the refusal rate was .2% of the total number of examinations administered. The evidence suggests that the refusal rate is minuscule because the examination does not include lifestyle questions. The rate has remained relatively constant since the implementation of the Counterintelligence-scope Polygraph Program seven years ago. In accordance with the Department of Defense policy, the persons who declined taking the examination were subsequently denied access to the classified information in question, but retained their positions or were transferred to other positions in the organization of equal pay, responsibility, and commensurate with the clearance level held before the declination.

IV. Examinations Requiring More Than Two Series or More Than One Day

Of the total examination population of 16,328 individuals, 1,422 required more than two series (a series is defined as the collection of at least two polygraph charts on an examinee). A total of 932 examinations required more than one day to complete.

Of the individuals for whom the examination lasted more than one day or required more than two series, 289 yielded deceptive or inconclusive examination results. These results are documented in more detail later in this report. The remaining extended examinations were subsequently determined to be non-deceptive. These non-deceptive examinees were given access or continued access to the programs requiring the polygraph.

V. Examination Results

The examination results of the 16,328 individuals tested under the Department of Defense Counterintelligence-scope Polygraph Program are:

(1)	No Opinion	10
(2)	Inconclusive	52
(3)	No Deception Indicated	16,029
(4)	Deception Indicated	237

(1) No Opinion:

There were ten persons who, because of medical or psychological considerations, were unable to complete the polygraph examinations, resulting in insufficient data to form an opinion.

(2) Inconclusive:

There were 52 persons whose polygraph examination results were opined as inconclusive, i.e., the physiological data was insufficient to determine whether the examinees were deceptive or non-deceptive. Many of the individuals in the category were given more than two series of examinations on two or more testing days by different examiners. In most of the cases, an investigation was initiated to resolve the matter in question.

(3) No Deception Indicated:

There were 16,029 individuals in this category. These persons either retained their positions with access to classified information or were granted such access.

(4) Deception Indicated:

Of an examination population of 16,328 persons, 237 were adjudged to be deceptive in their responses to the relevant counterintelligence-scope questions. The 237 individuals, like all examinees, had previously been interviewed by security professionals and had been thoroughly investigated. These cases demonstrate the importance of the polygraph, for without its use it is doubtful that the information developed would have been forthcoming. The following are some examples of information developed when the examination results indicated deception:

> During the post-test interview, the examinee stated that he had divulged classified information to an unauthorized individual regarding a classified program. He further admitted that he had removed classified information, without authorization, from a secure facility and that he currently had, in the trunk of his car, computer disks that he removed from a secure facility. He promptly returned the computer disks to the secure facility. None of his actions were for espionage purposes.
>
> A senior Navy officer admitted the unauthorized disclosure of CONFIDENTIAL and SECRET submarine data to his former and current spouses, unauthorized disclosure of SECRET Persian Gulf War data to his spouse and the wife of a co-worker, and social contact with Soviet citizens on two occasions that had not been reported to command. Continued polygraph testing substantiated the absence of additional disclosures and unreported contacts.
>
> A senior Navy officer admitted having withheld information from the Naval Investigative Service and the Federal Bureau of Investigation regarding criminal activity by a Navy member who was involved in espionage activities with John A. Walker. Continued polygraph testing substantiated the absence of additional withheld information.
>
> A civilian government employee who is a participant in an Army Special access Program was tested over a four-day period by two examiners. When confronted with his continuing deceptive test responses, the employee admitted that he had taken classified documents home with him so that he could proofread certain drafts. While

doing this work at home, the employee's uncleared spouse asked if she could help him with the project. The employee then gave the documents to his wife for proof-reading. Confirmatory testing which followed these admissions continued to indicate deception. The employee terminated the examination process when asked to explain the reasons for the deceptive test responses. This case was referred to the Federal Bureau of Investigation.

An Army member assigned to sensitive intelligence duties in Europe requiring access to TOP SECRET information was administered two polygraph examinations by different examiners. On both occasions the examination results indicated deception. When recontacted by a third examiner to schedule further efforts to resolve the matter, the member refused any further participation in the counterintelligence-scope polygraph process. No admissions were obtained, although certain clarifying information of counterintelligence interest was provided. The case was subsequently closed when it was determined that the member was discharged from the Army. The case was referred to the Federal Bureau of Investigation.

A civilian government employee with access to an Army Special Access Program was tested on two occasions by different examiners with results indicating deception each time. The employee refused subsequent efforts to reschedule additional testing. No admissions were obtained, and the matter remains unresolved. Subsequent investigative efforts determined the possibility of a relationship between this case and another on-going counterintelligence investigation.

A former Army Sergeant assigned to sensitive intelligence duties in Europe requiring access to TOP SECRET information was tested on three days by two examiners without resolution of deceptive test responses. No admissions were obtained, and the matter remains unresolved. It was subsequently determined that the Sergeant was discharged from the Army during the interim period between final field testing and independent quality control review of the case. The Sergeant was recontacted in the United States to determine his willingness to continue the examination process to a favorable resolution; however, he refused to take part in any further testing. The case was referred to the Federal Bureau of Investigation.

A civilian government employee with access to an Army Special Access Program admitted, when confronted with examination results indicating deception, that he had

provided classified information, pertaining to certain Soviet military capabilities, to a representative of the United Kingdom before the information was subsequently cleared for release to the United Kingdom. The employee acknowledged that he had compromised the document and had not reported his mistake to security authorities. No additional admissions were obtained, and all relevant areas were subsequently resolved through confirmatory testing.

An Army member assigned to sensitive intelligence duties in Europe requiring access to TOP SECRET information was tested by two examiners on two separate test days with continuing results indicating deception. The member was discharged from the Army before the matter was resolved. He subsequently declined to participate any further in the testing process. No admissions were made. The case was referred to the Federal Bureau of Investigation.

VI. Utility of the Polygraph

During fiscal year 1991, as illustrated previously in the report, the utility of the polygraph in national security investigations as demonstrated to be unique and significant. At Appendix B are various accounts of interviews conducted with the aid of the polygraph. In all instances, the polygraph examination process produced significant security or criminal information which would not otherwise have been obtainable. It was also invaluable in helping to establish the innocence of persons confronted with serious accusations.

VII. Expansion of the Polygraph Program

The reduction in the numerical ceiling for counterintelligence-scope polygraph examinations from 10,000 in fiscal years 1988 through 1990 to 5,000 in fiscal year 1991 and the outyears will severely limit the Department of Defense's capability to provide counterintelligence-scope polygraph support to some of its most sensitive programs.

In this regard, we have proposed to raise the numerical ceiling back to the 10,000 level and to clarify Department of Defense's authority to examine certain categories of persons who, because of their access to highly classified information and the sensitivity of their duties, are extremely vulnerable to espionage attempts. These categories include persons who are assigned to the On-Site Inspection Agency and certain Department of Defense personnel assigned to overseas locations. While these individuals

are not involved in Special Access Programs and do not occupy Critical Intelligence Positions as designated by the Director of the Defense Intelligence Agency, they nevertheless occupy positions that warrant the additional security of the counterintelligence-scope polygraph examination.

We are also recommending that personnel assigned to the Defense Intelligence Agency and the Service Cryptological Elements be included in the exempted categories. They would occupy an exemption category identical to personnel assigned to the Central Intelligence Agency, the National Security Agency, and personnel with access to cryptographic materials and intelligence reconnaissance programs. We are making the foregoing recommendation because: 1) personnel assigned to the Defense Intelligence Agency have virtually identical access to classified information and programs as personnel assigned to the Central Intelligence Agency and the National Security Agency; and 2) personnel in the Service Cryptological Elements are privy to the same sensitive cryptologic information as personnel assigned or detailed to the National Security Agency.

Counternarcotics is another area that could benefit from the use of the polygraph. Thus, the Department of Defense is currently developing plans for the possible use of a polygraph screening examination to protect sensitive sources and information in counternarcotics operations. The polygraph screening plans are to include personnel who have narcotics monitoring and interdiction responsibilities. The use of the polygraph to combat narcotics is a reflection of the Department of Defense's increasing role in interdicting the flow of illegal drugs into the United States.

VIII. Qualification Standards for Department of Defense Polygraph Examiners

The Department of Defense maintains very stringent standards for polygraph examiners. The Department of Defense Polygraph Institute's basic polygraph program is the only known program that is based on forensic psychophysiology, and conceptual, abstract, and applied knowledge that meets the requirements of a master's degree level of study. Candidates selected for a Department of Defense polygraph position must meet the following minimum requirements:

1. Be a United States citizen.

2. Be at least 25 years of age.

3. Be a graduate of an accredited four-year college or equivalent and have two years of experience as an investigator with

a recognized Federal or other law enforcement agency. Two years of comparable experience may be substituted for the requirement of investigative experience with a Federal or other law enforcement agency.

4. Be of high moral character and sound emotional temperament, as confirmed by a background investigation.

5. Complete a Department of Defense-approved course of polygraph instruction.

6. Be adjudged suitable for the position after being administered a polygraph examination designed to ensure that the candidate realizes and is sensitive to the personal impact of such examinations.

After completing basic polygraph training, the individual must serve an internship consisting of a minimum of six months on-the-job training and conduct at least 25 examinations under the supervision of a certified examiner before being certified as a Department of Defense examiner.

Department of Defense Polygraph Examiners

FY Year	Average Number of Examiners	Number Decertified*	Percent Attrition
1983	100	11	11.0%
1984	109	12	11.0%
1985	115	15	13.0%
1986	141	8	5.7%
1987	168	25	14.9%
1988	235	34	14.5%
1989	261	26	10.0%
1990	270	17	6.3%
1991	269	40	14.9%

*Decertification denotes all persons released from polygrapher duties regardless of the reason. Some of the reasons for decertification are retirement, transfer, request for release from polygraph duties, and failure to maintain standards.

IX. Polygraph Research

Department of Defense Polygraph Institute

The Department of Defense Polygraph Institute was established in 1986 by Department of Defense Directive 5210.78. The Polygraph Institute's research mission is in response to Congressional guidance contained in the Fiscal Year 1985 and subsequent Defense Authorization Acts. This legislation mandates the Department of Defense to conduct research to: 1) evaluate the validity of polygraph techniques, 2) conduct research on polygraph countermeasures; and 3) conduct developmental research on polygraph techniques, instrumentation, and analytical methods.

Research conducted by the Polygraph Institute is coordinated through an interagency group called the Polygraph Research Subcommittee of the Personnel Security Committee. The Polygraph Research Subcommittee is chaired by the Polygraph Institute and its primary function is to consult and advise those Federal agencies involved in polygraph research. The Polygraph Research Subcommittee recommended that the Polygraph Institute give top priority to improving polygraph examination accuracy by developing computerized methods of analyzing traditional and new physiological parameters. The Polygraph Research Subcommittee also recommended that the Polygraph Institute develop a government archive and research library on detection of deception. This latter recommended was implemented with the funds provided by the Army Deputy Chief of Staff for Intelligence, and will enable the Polygraph Institute to access standard research data bases such as the Social Science Citation Index, Index Medicus, and Current Contents. During fiscal year 1991, the Polygraph Institute also computerized enough of its polygraphs so that all research examinations may be digitized for computer analysis. The Research Division staff of four doctoral-level researchers and three assistants is being augmented by seven additional employees. Moreover, a five-year research plan was developed to enable the Polygraph Institute to maximize the use of its limited resources.

Department of Defense Polygraph Institute Studies Completed in Fiscal Year 1991

Evaluation of the Computer Assisted Polygraph System. A number of computerized polygraph systems are being developed in the private sector. The Polygraph Institute evaluates the systems for potential use by the Department of Defense. The evaluations include their dependability during an examination, ease of use, and the soundness of their design. If the computerized polygraph systems are programmed to evaluate physiological information, the Polygraph Institute also evaluates the accuracy of their evaluation. During fiscal year 1991, the Polygraph Institute completed

its evaluation of the Computer Assisted Polygraph System, which has been used by the United States Secret Service for several years. This system is designed to evaluate a subject's responses for deception. The Polygraph Institute tested the accuracy of the Computer Assisted Polygraph System in a mock crime study and found it to be about as accurate as the decisions made by polygraph examiners; however, it has some limitations. It does not store all of the physiological data it collects; and it is designed for criminal investigations, whereas most of the Department of Defense's examinations are for security screening.

Effect of Cultural Variables. Little is known about the accuracy of the polygraph as it relates to assessing responses of foreign nationals. Building upon the work completed in Fiscal Year 1990, the Polygraph Institute, in Fiscal Year 1991, interviewed Japanese and American polygraph examiners working or stationed in Japan to determine potential problems in examining people whose cultures differed from that of the examiner. No evidence was found to conclude that a difference in cultural background affects the accuracy of evaluating responses. It was found, however, that the general inability of American examiners to speak Japanese required the use of an interpreter, which may limit the quality of the test. Additional research is necessary to explore this hypothesis.

Aural/Visual Study. This study compared the effectiveness of hearing the polygraph questions with seeing them displayed sequentially on a computer terminal. The study, which used a guilty knowledge test, found that both methods of question presentation were equally effective. This suggests that computers may plan a larger role in the polygraph examination process.

Unauthorized Disclosure Question. The purpose of this study was to examine the utility and cost effectiveness of security screening examinations in which questions are asked regarding the disclosure of classified information to unauthorized persons. The study was canceled because the resources were not available to collect field data.

Department of Defense Polygraph Institute Studies Pending in fiscal Year 1991

Counternarcotics polygraph test. The Polygraph Institute is developing a polygraph screening test to identify drug interdiction task force members who may be providing drug smugglers with sensitive information. A series of studies were conducted in fiscal year 1990. In fiscal year 1991, the Polygraph Institute conducted an additional study. The results are being analyzed.

Systolic Time Intervals. A research team is being organized to explore a new measure of deception (changes in the time it takes

for various phases of the heart beat to occur) and a new method of analyzing various physiological measures for deception (cumulative summations or "cusums"). Preliminary work continues to be encouraging. These technologies may be able to significantly increase the polygraph's accuracy. This work is based on the promising studies conducted in Fiscal Year 1990.

Evaluation of the Axciton computerized polygraph. The Polygraph Institute purchased several computerized polygraphs manufactured by Axciton. This system differs from the Computer Assisted Polygraph System units previously discussed. The Computer Assisted Polygraph System used a conventional polygraph (modified to provide output to a computer) to record the data, whereas the Axciton system is a completely self-contained unit having its own sensor junction box. The software for analyzing the physiological data is considerably simpler than that of the Computer Assisted Polygraph System. The Polygraph Institute is evaluating the Axciton to determine its effectiveness.

Development of Data Analysis Software. The National Security Agency has contracted with the Applied Physics Laboratory of Johns Hopkins University to develop software to analyze polygraph data. The Department of Defense Polygraph Institute is providing several types of support to the National Security Agency and the Applied Physics Laboratory on this contract. The Applied Physics Laboratory needs digitized physiological data collected from verified deceptive or truthful subjects in order to develop this software. During fiscal year 1991, the Polygraph Institute provided the Applied Physics Laboratory with data from 60 subjects given polygraph examinations on the Computer Assisted Polygraph System, and data from several hundred subjects examined on the Axciton computerized polygraph. In addition, the Polygraph Institute trained a number of Federal and police examiners in the use of the Axciton to enable the Applied Physics Laboratory to obtain digitized polygraph data collected in field settings.

Designing a validation study using criminal cases. The purpose of this study is to design a better field validation methodology to estimate polygraph accuracy. The Department of Defense has provided the contractor with sanitized polygraph cases for analysis. The contractor is presenting selected cases to three different panels to determine the most effective type of panel and the amount of investigative information necessary for panelists to assess the deception or non-deception of subjects.

Diverse sensors. This study compares the various methods of recording respiration, electrodermal and cardiovascular activity. For example, respiration can be recorded by either pneumatic tubes or mercury strain gauges, both of which are placed around the thorax or abdominal areas of the body. Electrodermal activity is

measured by placing steel plates or silver chloride sensors on selected fingers. Cardiovascular recordings can be obtained by a blood pressure cuff attached to the upper arm or a plethysmograph placed on a finger. A thermistor placed on the skin can record temperature changes and by inference serve as an index of peripheral blood flow.

Numbers test. Department of Defense polygraph examiners often include a numbers test as part of the overall testing of criminal suspects. In this test, the examinee selects one of several numbers, then lies about which number was selected. Although it is generally believed that a demonstration of the polygraph's accuracy and sensitivity reduces potential errors, there is some question whether the numbers test should be conducted before or after the first repetition of the investigative questions. In a joint study with the Polygraph Institute, the United States Army Criminal Investigation Division Command conducted criminal-investigation polygraph examinations using both methods of administering the numbers test. The results are being analyzed by the Polygraph Institute. Preliminary results suggest that both methods provide similar results.

Lie detection bibliography. The literature on physiological detection of deception and other methods of credibility assessment is mushrooming. The purpose of this joint National Security Agency and Department of Defense Polygraph Institute project is to create a comprehensive bibliography of credibility assessment. In fiscal year 1991, the literature search was completed with over 6,000 citations located. The data are being inputed, using Pro-Cite software.

Countermeasures. As more countries acquire a polygraph capability, the danger increases that foreign intelligence services may devise effective methods to counter our security-screening examinations. This program assesses the vulnerability of the polygraph to various types of countermeasures and explores means of counteracting them.

Skin resistance vs. conductance-2. Most of the polygraphs used in the field record skin resistance, while most researchers work with skin conductance. A preliminary study comparing the two methods found that both are equally accurate for detecting deception, but that skin conductance may be somewhat more convenient with which to work. The follow-up study examines this latter issue using a different methodology. Data collection has been completed. The preliminary analysis suggests that conductance is more stable, requiring fewer adjustments by the examiner to keep the tracing centered.

Numerical evaluation threshold for decisions. Polygraph charts from verified field cases provided by the United States Secret Service and other sources are being studied to determine the optimal numerical evaluation threshold for accurate decisions. This project also includes studies to determine what the numerical evaluation thresholds should be for decisions on individual questions and on multi-issue tests.

Diagnostic value of the sacrifice relevant question. Examinees generally overreact to the first question on a polygraph test, whether they are lying or telling the truth. This reaction, known as the orienting response, is not evaluated by the polygraph examiner, who deliberately asks an unimportant question to absorb the initial response. Since some innocent persons may also produce an orienting response to the first relevant question later in the test, some polygraph tests incorporate a sacrifice relevant question which is not evaluated for deception. The Department of Defense Polygraph Institute is presently engaged in a study to determine whether responses to the sacrifice relevant question are helpful in differentiating between non-deceptive and deceptive subjects.

Diagnostic value of tonic galvanic skin response and heart rate levels. Control question tests are scored by comparing a person's reactions on the relevant questions against his or her reactions on the control questions. Thus, each person is compared against normative data provided by him or her, and not to norms derived from other people. This procedure excludes potentially useful physiological data. For example, it may be that people with unusually rapid heart rates or unusually sweaty palms are more likely to be deceptive than non-deceptive. Currently the Polygraph Institute is studying this issue to determine whether certain types of tonic physiological information may help differentiate between non-deceptive and deceptive subjects.

Rankings of relevant questions on multi-issue tests. When administered a multi-issue test, it is not uncommon for a person to be deceptive to some of the relevant questions but non-deceptive to others. Several studies have shown that, in such a situation, the polygraph is very accurate at grossly differentiating between the person who is non-deceptive to all questions and the person who is deceptive to at least one of the relevant questions. Those studies have also shown, however, that it is much more difficult to determine precisely which relevant question(s) produced the deceptive response(s). The reason for this anomaly is that the scoring systems do not measure the magnitude of a person's reaction to a question, but its magnitude relative to that of a control question. Conventional scoring systems generally do not consider which relevant question produced the greatest reaction, because the reaction is often evaluated against those produced by different

control questions. The Polygraph Institute is assessing the value of comparing the responses to all relevant questions with those of a single control question to rank the order of the reactions. The study is based on an hypothesis asserting that when a person is deceptive to some of the relevant questions and not to others, the reactions to the deceptively answered questions should be larger, thereby identifying the question(s) causing the problem.

National Security Agency
Studies Completed in Fiscal Year 1991

Validity of simulated polygraph cases. In Fiscal Year 1990, the National Security Agency completed a study on the validity of polygraph decisions in actual cases, based on all such studies completed in the previous decade. The overall accuracy rate, based on ten studies involving 2,042 polygraph test results, was 98%.

As a follow-up to that study, the National Security Agency examined over 300 lie detection experiments to determine which was reasonably similar to polygraph examinations in actual cases. Thirty research projects met the standards of simulated testing. The average accuracy rate for the 538 subjects in the truthful role was 86%; the average accuracy rate for the 608 subjects in the deceptive role was 84%; and the average accuracy rate for the 1,146 subjects was 85%.

In a separate study, the National Security Agency assessed the accuracy rates in seven experiments where the tests simulated field conditions. The charts were independently evaluated by examiners who were blind to the questions, pre-test facts, and all other details. The average accuracy rate for the 243 sets of charts from those in truthful roles was 81%. The average accuracy rate for the 220 sets of charts from those in the deceptive roles was 84%. The overall accuracy rate for the 463 sets of charts was 83%.

Although there were only two simulated studies involving peak of tension tests or guilty knowledge tests, there were 113 laboratory studies that used these techniques and that listed the details of the tests and results. In most such studies, the object was to pick either the pre-selected number or an item from a list of numbers or items. The average accuracy rate for the 453 subjects in truthful roles was 93%. The average accuracy rate for the 4,373 subjects in deceptive roles was 67%. The overall accuracy rate for the 4,826 subjects was 69%. Only 17 of the 113 experiments had subjects in truthful roles. There were many more studies using peak of tension tests or guilty knowledge tests that did not provide details of the methodology, or did not provide the results.

Predictive Value of the Sacrifice Relevant Question. One of the most commonly used polygraph formats is the zone comparison test. A distinctive feature of the zone comparison test is the use of a "sacrifice relevant" question, i.e., a question that is relevant to the issue at hand but is not numerically scored to determine deception or non-deception. It is not scored because it is the first question in the test that relates to the crime or incident at issue and is considered a buffer. It is often worded as an in-test question, i.e., "In regard to the burglary, do you intend to answer all of my questions truthfully?" Although the question is not scored, many examiners believe a reaction or lack of reaction to it is predictive of the test outcome. To test that hypothesis, an experienced examiner compared the reaction to the sacrifice relevant question to the reaction to the preceding irrelevant question on 100 sets of confirmed zone comparison charts, in which 49 sets were confirmed deceptive by subsequent confession and 51 sets were confirmed non-deceptive by the subsequent confession of the actual perpetrator. The sets were taken at random from a much larger collection of confirmed cases. Using this single measure for reading charts, the examiner was correct in 30 of 49 deceptive cases for an accuracy rate of 61%, and 41 of 51 non-deceptive cases for an accuracy rate of 80%. The combined accuracy rate was 71%, suggesting the possibility of incorporating the scoring of the sacrifice relevant question in zone comparison test analysis.

Reliability of Individual Polygraph Parameters. This study was undertaken to determine the relative value of each sensor component of a polygraph examination. The study included the review of data from all available studies of the accuracy of field polygraph testing to compare the consistency of each of the sensor components with the final determination on each respective test, i.e., readings from the cardiovascular, electrodermal, and respiratory channels were compared separately with the final decision rendered on the test. There were 22 studies of actual cases from which data on one or more channels were taken. The results showed a reliability rate of 76% for cardiovascular, 81% for electrodermal, and 81% for respiration channels.

National Security Agency
Studies Pending in Fiscal Year 1991

Polygraph Computerization. An effort is underway to develop computer algorithms to read polygraph charts. It is expected that the computer algorithms will result in increased validity and reliability. Software using one or more statistical methods will be delivered for field testing before September 1992. Statistical methods under study include log regression analysis, neural networks, time-series, and projection pursuit. The work is a collaborative effort of Federal, state, and local agencies. The

primary contractor is the Applied Physics Laboratory of Johns Hopkins University.

Betrayal of Trust and Espionage. This study examines the betrayal of trust as a primary factor in the commission of espionage. The study is a collaboration between the National Security Agency and the Department of Defense Personnel Security Education and Research Center. Betrayal of trust was chosen as the object of the study because it is a measurable quantity in some personality tests, and it has been the focal point in several past studies of persons found guilty of embezzlement and various kinds of computer crime. A literature search has been completed. The study will also include consultation with leading psychometricians and criminologists. This work is being coordinated with other studies of espionage and the use of the polygraph in counterintelligence and security matters.

Component Contribution and Criterion Frequency. A study is currently underway to learn the chart scoring tendencies of field polygraph examiners. The study is comprised of 11 experienced examiners who are graduates of eight different polygraph schools or courses, and are working in Federal programs, local law enforcement, or private practice. The examiners will independently score 40 sets of confirmed zone comparison charts. They are to describe in detail the process by which they determine each score. The resultant data will be useful in developing computer algorithms and teaching manual scoring of standard charts in basic polygraph training courses.

Nonverbal Detection of Deception. This study explores the possibility of quantifying nonverbal and paralingual behavior associated with deception. The study will analyze the recorded interviews of suspects in criminal cases in which deception or nondeception was verified by confession of the suspect or that of another person.

Bibliography. The compilation of a bibliography on the various forms of lie detection is almost complete. It is a joint effort of the National Security Agency and the Department of Defense Polygraph Institute and will use bibliographies and research of the American Polygraph Association and the Federal Research Division of the Library of Congress. The last thorough bibliography, with some 3,000 entries, was published by the American Polygraph Association in 1983. The new bibliography will contain over 6,000 entries and will be available in print and on computer disks in Pro-Cite format.

APPENDIX A

DEPARTMENT OF DEFENSE POLYGRAPH PROGRAM STATISTICS: 1981 - PRESENT

FY	Criminal(%)	Exculpatory(%)	Counter Intelligence Scope Only*(%)	All Others**(%)	Total
1981	5,754(44.6)	1,111(8.6)	92(0.7)	5,947(46.1)	12,904
1982	5,267(37.0)	1,003(7.0)	216(1.5)	7,761(54.5)	14,247
1983	5,879(31.1)	1,035(5.5)	1,449(7.7)	10,517(55.7)	18,880
1984	5,237(24.7)	1,622(7.7)	4,606(21.7)	9,726(45.9)	21,191
1985	4,817(21.8)	2,344(10.6)	4,644(21.1)	10,261(46.5)	22,066
1986	4,366(17.5)	2,922(11.7)	6,505(26.1)	11,146(44.7)	24,939
1987	3,879(14.6)	2,742(10.3)	7,370(27.7)	12,588(47.4)	26,579
1988	5,101(12.8)	1,884(4.7)	21,000(52.5)	11,970(30.0)	39,955
1989	5,356(14.2)	1,530(4.0)	21,028(56.0)	9,681(25.8)	37,568
1990	4,089(10.6)	1,167(3.0)	26,014(67.0)	7,516(19.4)	38,786
1991	3,649(10.9)	889(2.6)	23,071(68.8)	5,951(17.7)	33,560

* Represents all counterintelligence-scope polygraph examinations to include those conducted by the National Security Agency for continued access and those conducted for the Department of Energy.

** Includes screening examinations conducted by the National Security Agency, specific issue examinations conducted in support of personnel security, counterintelligence and intelligence operations, and all other examinations that are not reported under the Criminal, Exculpatory or Counterintelligence-scope Only categories.

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ANALYSIS OF FEDERAL POLYGRAPH CHARTS BY SPOT AND CHART TOTAL

By

Michael H. Capps and Norman Ansley

Background

In 1960 Cleve Backster introduced the "spot analysis" chart interpretation technique. In 1961 Backster implemented the seven-position scale as part of that technique, including a numerical rating system by which polygraph charts could be evaluated. The "spot" is a pairing of a relevant and a control question which are compared one against the other. Summed scores for pairs of spots on each chart and then a set of charts determine the decision of truth, deception, or inconclusive. By use of Backster's scoring scale, examiners could assign a weighted numerical value to reactions based on the magnitude and duration of the same. Although numerical values were used by Winter in 1936 and taught at the Keeler Institute by Backster in 1951(Ansley 1951), no standardized system for polygraph numerical evaluation was published prior to 1961. After the development of a scoring scale for evaluation of polygraph charts, it was necessary to determine what scores would be used as cutoffs for determining truth or deception. Backster's original cutoff for truthful was +9 and for deceptive -9 on a two spot zone with two charts; and evaluating only the two most productive components. This evolved quickly at the United States Army Military Police School (USAMPS) at Fort Gordon, Georgia into a cutoff of +6 for a truthful score and -6 for a deceptive score, based on three charts, evaluating all three components. There seems to be no documented evidence as to why or exactly when these discrepancies occurred. The cutoffs implemented by Backster are printed in his 1962 standardized notepack but documentation concerning those cutoffs used by the USAMPS and now taught at the DoD Polygraph Institute are unavailable for review. We have reported on these two versions of Zone Comparison because of their widespread use. In fact, all of the courses currently accredited by the American Polygraph Association teach a Zone Comparison technique.

In the mid-seventies other researchers began to look at the numerical cutoffs used in polygraph examinations to identify truthful or deceptive subjects. Research from laboratory case charts indicated that the optimum cutoff was in the region of +/-2 to +/-4 (Raskin & Hare, 1978), based on three charts, scoring all

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three components. Further research corroborated this, demonstrating that the optimum cutoff level was in the region of +/-4 (Raskin et.al., 1978). Indeed, in 1985 Shterzer and Elaad, in using varied cutoff scores, found that +/-1 as a cutoff provided a significant degree of accuracy, comparing favorably with a +/-6.

In addition to the difference in numerical cutoff scores between Backster and USAMPS, differences existed in the number of spots, number of charts necessary for scoring and the number of components evaluated for final score. Backster's Zone Comparison test only contained two relevant question spots compared to three in the Army version. There seems to be little evidence however that the use of a third relevant question in a Zone Comparison test increases the accuracy of the test (Capps & Ansley, 1991). Backster also utilized the first two charts or the two most productive charts only in the decision-making process. USAMPS scored each component on all charts to make a decision of truth or deception. Senese at John E. Reid & Associates found greater accuracy in the second chart than in the first but did not report whether differences existed between truthful and deceptive (Senese, 1976). The Reid test format varies from the Zone in that it has only two control questions and four or five relevant questions. The Backster Zone test has no stim test, but the Reid and Army (now DoDPI) tests had a stim chart after the first and before the second relevant charts. In comparing the effect of stimulation tests on polygraph results, Kirby (1981) saw no difference in the accuracy of calls on first and second charts. As with Senese, Kirby did not differentiate between truthful and deceptive subjects. Recent research has indicated that those charts which may be the most productive for truthful may not be the same as those most productive for deceptive (Capps & Ansley, 1991). That same research demonstrates no statistically significant increase in accuracy for three charts as opposed to two charts, but there was a trend towards higher accuracy with three charts.

This research investigated the use of multiple charts and multiple spots in terms of their utility or necessity in a Zone Comparison polygraph examination. It further looked into the validity and utility of varied cutoff scores for determining truth and deception through the Zone Comparison technique. It additionally examined the spot rule in comparison to the traditional method of overall chart total scoring.

Habituation

One of the factors involved in the evaluation of the contributions of spots and charts relates to habituation. Habituation has been described as "a decrement in behavioral response associated with repeated presentation of an unreinforced stimulus." (Glickstein, 1969) Glickstein also notes that there is a corresponding

decrease in amplitude of evoked potential recorded from the cortex, and that such changes have also been seen in subcortical sensory relays as well. He adds, "A decrement may even be seen in the 'arousal' effects elicited by repeated stimulation of the brain stem reticular formation."

Kandal (1979) describes habituation as "a decrease in the strength of a behavioral response that occurs when an initially novel stimuli is presented repeatedly." He adds, "Although habituation is remarkably simple, it is probably the most widespread of all forms of learning ... [as we] learn to ignore stimuli that have lost novelty or meaning."

In evaluating the accuracy of scoring rules now used with Zone Comparison tests, and in preparing data for the development of algorithms to score polygraph charts with computers, we need to know if we should give equal value to similar reactions on each chart. We also need to know if the cumulative scores from the first spot (a score derived by comparing the first relevant question with an adjacent control), the second spot and the third spot of each chart should be given equal value. It seemed reasonable to assume that habituation might be a significant influence in reducing reactivity throughout a long test featuring repetition but somewhat moderated by a variety of questions that are repeated. Polygraph testing is different from most tests of habituation in that the latter feature repeated presentations of identical stimuli. To be useful in devising a scoring algorithm the habituation effect must be consistently significant without too much individual variation. In the research laboratory, electrodermal habituation has been the topic of many research projects (Gale & Edwards, 1986) which demonstrate a strong effect, but with many variables altering the effect, including personality.

It is possible that habituation rates alone may be useful in separating truth and deception. If the response to a relevant question that is answered truthfully is of lower signal value, closer to or in fact is an orienting response (OR) compared to the response to a question answered deceptively which is closer to or in fact is a defensive response (DR), then the difference may be useful. Sokolov (1963) reported that OR and DR response components may be distinguished in terms of habituation rates even if the response is quantitatively identical. The DR is reported to resist habituation while the OR does the opposite. Uno and Grings (1965) reported that the habituation effect varied with stimulus intensity. While our objective is not to identify the response as OR or DR, if truthfully answered questions habituate at a different rate than deceptively answered questions, we have a sound basis for Relevant/Irrelevant test formats and an additional method for analyzing other formats. The Uno and Grings research used skin conductance, skin potential, digital blood volume, pulse volume,

and pulse rate. Of the processes recorded, digital blood volume changes were most linearly related to stimulus intensity and most resistant to habituation from repetition; suggesting to the authors that in research, digital blood volume may be a preferred response indicator.

Habituation in Polygraph Examination Research

From October 1976 through July 1977, all suspects in armed robbery cases in Yamagata Prefecture, Japan who took a polygraph examination were subjects of a research program (Sagae, 1979). Raw data was gathered until examiners had 30 confirmed robbery cases in which the subjects subsequently confessed. Subjects were 28 men and two women, ages 20 to 48. Two features were added to the research tests, a two-minute norm period at the beginning of the first chart, and a fixed sensitivity setting on the electrodermal (skin resistance) for all subjects. Tests were all zone comparison with a stim test after the first chart. There were three charts relevant to the crime. After the second relevant chart an instruction was given in Japanese which translates as,' You have shown a very strong reaction to one of the questions in this examination. Can you tell which one it is? One can normally tell when there is this kind of strong reaction." That was followed by chart number three. The question was whether the instruction would weaken or stop the habituation of responses. Sagae reported that examinees maintained a high level of arousal throughout the tests, that cardio habituation was restrained by the instruction and that the electrodermal responses increased after the instruction. It was the author's view that respiration responses do not habituate during polygraph tests, but after the instruction the clarity and magnitude stayed the same or improved in all but one case, where it decreased in magnitude. The work also suggests that between chart instructions or discussion will change habituation rates, and between chart activity varies with techniques and examiners.

Backster (1961) measured the length of chart-time (in minutes at six inches per minute) that each channel produced useful reactions. Measurements were made from polygraph charts in his private practice in New York City. All the charts were from confession confirmed Zone Comparison truthful or deceptive cases. Time began with the announcement of the beginning of the test on the first chart to twenty seconds after the last question on each chart. the time between charts was not included. He averaged the time when a pattern becomes useful until it was no longer useful. He wanted to know the effect of habituation, and if there was a difference in habituation between truthful and deceptive subjects. He was also interested in how much productive testing time an examiner could plan on having available. In evaluating Backster's research for 1961-1963 it is worth noting that electrodermal units had a limited range of up to 100,000 ohms, possibly up to 250,000

ohms, and the cardio and respiratory tracings were from pneumatic tambors. Because the author does not give the number of subjects, in the sample and a lack of precise definitions of effectiveness, his findings must be used with some caution. Backster reported the following period of time as "good" or "excellent." (Other times were "fair" or "poor.")

Truthful: Cardio - 4 to 18 minutes
Respiration - 0 to 12 minutes
GSR - 6 to 24 minutes

Deceptive: Cardio - 5 to 22 minutes
Respiration - 0 to 15 minutes
GSR - 7 to 28 minutes

Backster's results are in concert with the concept that responses to truthful answers habituate more rapidly than responses to deceptive answers. The material is not supportive of Sagae's view that the respiration does not habituate.

One issue in habituation during polygraph testing is the effect of alternating or switching topics, confounded by the fact that some topics have more signal value than others. In addition, there may be an effect for serial position. In 1982 Ben-Shakhar and Lieblich studied the effect of the serial position of relevant stimuli on skin conductance response. Using 103 students at Hebrew University, the experimenters manipulated the position of the key number in the second, fourth, sixth or eighth position in peak of tension tests. They found that the magnitude of the skin conductance reactions decreased as a function of the serial position of the key number in the test series. However, in a later study Ben-Shakhar and colleagues (1989) found different results, a late advantage over early advantage for the serial effect in one project, and no serial effect in another. As to habituation, Ben-Shakhar, Lieblich and Kugelmass (1975) tested 83 Hebrew University students to see if their skin conductance would habituate at the same rate for a repetition of the subject's first name repeated 20 times at random intervals of 11 to 19 seconds, compared to a repetition of a name with no personal meaning at similar intervals. Presumably the subject's first name, with a higher signal value, would habituate more slowly. Habituation was not extinction of the response. Instead, they said it occurred when there were two consecutive responses of less than 20% of the initial response. The habituation rates did not differ at a statistical significance ($p > .05$), despite the fact that the first name habituation curve was somewhat higher on the response amplitude axis. In a second experiment with 100 students, the authors presented each subject with five randomized name lists, some names being friends or relatives taken from a questionnaire. The interval was ten seconds, and a neutral name was used as a buffer at the beginning

of each list. The detection of meaningful names in the second project was above chance. The authors said it was possible to predict the characteristics of standard information detection experiments from habituation curves using a notion of dichotomization.

In a simple laboratory experiment on lie detection, at the University of Toronto, the electrodermal responses were said to be small, like those of orienting responses. The authors, Furedy, Davis and Gurevich (1988), said that in this study the differentiation of deception (by electrodermal responses) did not diminish over trials.

Geldreich (1941) used 50 Kansas State Teacher College students in each of two groups and conducted peak of tension tests of five cards each to determine the rate at which he could pick the one card in five the student had mentally selected. For the control group, the detection rate was 37 of 50 (74%). The second group saw 25 to 50 neutral cards, the testing ending when there was no electrodermal response for five successive cards. Immediately thereafter, these students were presented the five cards which included the one they had selected. In all fifty cases (100%), the selected card created the largest GSR response. The author was of the opinion that the repetition adapted the subject to the non-guilty cards, reducing extraneous reactions.

Hemsley, Heslegrave and Furedy (1979), using a preemployment test paradigm tested students to study detection of lies about some of the 20 items of biographical information supplied on application forms. Skin conductance responses were significantly greater for deceptive answers than non-deceptive answers, but no habituation effect emerged. However, in research on drug effects on polygraph tests, using a Guilty Knowledge Test (GKT) format, Iacono, Boisvenu and Fleming (1984) did find that the skin conductance response amplitude became less evidence in differentiating between critical and irrelevant alternatives with each additional question, suggesting that the validity of the GKT may decrease if the test lists are too long. Also testing the effects of drugs on polygraph tests, Kamei et.al. (1965) noted that electrodermal responses gradually decreased as an electric shock was repeated. The effect of habituation on a subsequent card test was not reported, except to say the detection was good and the responses were smaller than those produced by the shocks. Similarly, Kizaki and Yamaoka (1978) found significant habituation of skin potential reactions over trials in a novel peak of tension test. However, skin potential is not an electrodermal recording used in field polygraph tests.

In a mock crime experiment using examiners in training and experienced polygraph examiners employing field polygraph instruments, Suzuki and Hikita studied the resulting polygraph charts for

habituation. Each of the 30 subjects (20 men, 10 women) was tested with a five-question peak of tension test, repeated ten times. Each test employed the same sequence, with the stolen item listed at question three. In order of utility, the respiration was the most effective at detection, then the electrodermal, and last the cardio. Of the ten tests given each subject, habituation apparently caused a severe drop in interpretable responses after the fifth test for all three channels. From the sixth to tenth chart the electrodermal became a somewhat better discriminator.

Procedure

The original examiner score sheets for 131 Zone Comparison polygraph cases were withdrawn from the polygraph files of a Department of Defense agency. These cases represented all the confirmed Zone Comparison polygraph cases for that agency over a three year period (1988-1990). It should be noted that the agency uses MGQT much more often than the Zone Comparison. Of those 131 cases, 86 were deceptive and 45 were truthful. The 86 deceptive cases were all confirmed by confession. the 45 truthful cases were circumstantiated, and in some cases were tested again with the same results. None of the truthful cases had other independent verification. All 131 cases had been reviewed by quality control and the results approved. Additionally, the first 50 original examiner score sheets of Zone Comparison polygraph cases were withdrawn from the files of the same agency. These cases were not confirmed but an opinion was rendered as to the results by the original examiner and approved by quality control. By chance, there were no truthful cases among them. This set of score sheets was used to see whether or not there was a difference in the scores of confirmed and non-confirmed polygraph cases, as alleged by some researchers (Lykken, 1979, 1981; Patrick & Iacono, 1991).

The examinations were all conducted with Lafayette polygraph instruments that recorded thoracic breathing, abdominal breathing, electrodermal activity and cardiovascular activity. The examinations were administered by nine examiners with a range in experience from nine months to four years. Each examiner held a baccalaureate degree and was an experienced investigator. All were graduates of the DoD Polygraph Institute. The examiners scored each of the examinations by question spot and by chart using either a three-position or seven-position scale. The scale used was determined by the examiner. All of the examiners alternated between scoring scales, with no one examiner using either scale exclusively. All 131 examinations contained three charts, but only 127 of the examinations contained three spots (relevant questions). Of those four examinations that had only two spots for comparison, all four resulted in truthful determinations.

For this research, the numerical scores of the charts were compiled by chart and by sets of charts for truthful and deceptive groups. The numerical scores were also totaled by spot for each chart and set of charts. Scores from chart totals were averaged and so were the spot totals. Combinations of only the first and second charts from each set were scored and categorized as to truth or deception indicated. This was also done for all three charts as is the common practice. These results were compared as to their effectiveness in determining truth or deception with plus (+) or minus (-) scores.

Spot scores for each question spot comparison were also tabulated as to their effectiveness in determining truth or deception by plus (+) or minus (-) scores. These were put in tables according to position on each chart.

Cutoff scores for determining truth or deception were investigated to determine which cutoff would yield the highest accuracy, which would yield the greatest utility, and from the combination to derive the optimum cutoff scores. This as accomplished by recording the number of true positives, false positives, true negatives, false negatives, and inconclusives, beginning with scores at zero.

Also examined were the results of a rule that requires a determination of deception indicated if a score of minus three (-3) or higher is assigned in any overall spot total; and a determination of inconclusive is made if zero, minus one (-1), or minus two (-2) is assigned in any overall spot total.

Finally, the average scores for the confirmed examinations were compared with the average scores of unconfirmed examinations. The scores for charts and spots were calculated for both the confirmed and unconfirmed examinations. Each of the spot totals and chart totals were compared with each other to determine whether or not any difference existed in terms of the contribution of each to the overall score.

Results

This study found that chart number one produced the most correct decisions for confirmed truthful subjects although not significantly more than chart number two or number three. Chart number one produced 40 correct decisions with three errors and two inconclusives. Chart number two produced 37 correct decisions with six errors and two inconclusives. Chart number three, the most accurate, produced 39 correct decisions with two errors and four inconclusives. See Table 1. Spot number one produced the most correct responses but not significantly more than spot two or spot three. Spot number one produced 43 correct responses with two

errors and no inconclusives. Spot number two produced 42 correct responses with two errors and one inconclusive. Spot three produced 40 correct responses with zero errors and one inconclusive. Four chart sets did not have a third spot. Spot three was the most accurate. See Table 2.

For the confirmed deceptive subject charts number three produced the most correct decisions with 72, 12 errors, and two inconclusives. Chart number two produced 68 correct decisions with nine errors and nine inconclusives. Chart number one produced 60 correct decisions with 15 errors and 11 inconclusives. See Table 3. spot number two produced the most correct deceptive responses of the question spots with 76 correct decisions, seven errors and three inconclusives. Spot number two was also the most accurate. The third spot was correct in 66 decisions with 13 errors and seven inconclusives. The first spot was correct in 59 decisions with 20 errors and seven inconclusives. See Table 4.

When averaging the scores of each chart and each examination the truthful had a mean score of +4.5 for chart one, +3.7 for chart two, and +4.2 for chart three. No statistical difference was found. The overall average after summing three truthful charts was +12.3.

When averaging the scores of each deceptive chart and each examination there was a mean score of -3.1 for chart one, -3.3 for chart two, and -2.9 for chart three. Again there was no statistically significant difference between the charts. However there was a statistically significant difference between the average totals of the three charts away from zero, with deceptive at -9.3 and -12.3 for truthful. This difference was highly significant.

When averaging the spot scores for truthful subjects the mean for spot one on each of the charts was +6.1, for spot two +3.3, and for spot three +3.2, with an overall average of +4.2. The spot scores for deceptive subjects were -1.9 for spot one, -4.3 for spot two, and -3.0 for spot three, with an overall average of -3.1. Again the overall average for truthful subjects is significantly further from the zero score than that of deceptive ones.

When the scores from charts were combined to determine the accuracy of decisions based on more than one chart, the accuracy of decisions, excluding inconclusives was not significantly grater for three charts than for two charts, for the truthful subjects or for the deceptive subjects. See Tables, 5, 6, 7, 8, 9 and 10.

When the scores from spots one and two were combined but separated from spot three there was no significant difference in the accuracy of two spots as opposed to three spots. See Tables 10, 11, 12 and 13.

The effect of a rule that is referred to as the "minus three (-3) spot rule" or simply as the "spot rule" was tested. This rule required a determination of deception indicated for the relevant questions when a spot total was minus three (-3) or greater and a determination of inconclusive where a spot total was minus two (-2), minus one (-1), or zero. With the use of this rule, 22 of 25 confirmed deceptive cases were called deceptive that would have been called inconclusive otherwise. Two of two confirmed deceptive cases were called deceptive that would have been called truthful otherwise. However, two of 45 confirmed truthful cases were also called deceptive and three were called inconclusive.

A comparison was made between the characteristics of the unconfirmed polygraph cases and confirmed polygraph cases. Since all of the unconfirmed cases were called deceptive, only those confirmed cases that were verified as deceptive were used in the comparison. The average score of the unconfirmed cases was -9.4 and the average score for the confirmed was -9.3. Both had the highest average score for chart two, followed by chart one, then chart three. Both had the highest average score for spot two, followed by spot three, and then spot one. See Tables 14 and 15. For the unconfirmed cases the spot rule was employed in 18% of the cases. For the confirmed cases the spot rule was employed in 22% of the cases. Truthful and deceptive confirmed cases were both used in this comparison since the spot rule was employed with each.

Discussion

It appeared from the data found in the 131 confirmed cases that were the subject of this study that three charts did not significantly increase the accuracy of polygraph examinations over two charts. See Tables 9 and 10. Until cutoff scores for two charts are established the utility cannot be determined for comparison with pre-existing cutoffs for three charts. However, at the standard +/-6, the third chart reduced the inconclusive rate by 14%. The presentation of three similar relevant questions on each chart did not produce more accurate results than the presentation of two similar relevant questions, especially using the +/-4 cutoff for a two relevant question zone comparison test employed by DoDPI (Schwartz, 1991). See Tables 10 and 13.

The effect of the minus three (-3) spot rule could not be investigated fully as in a previous study (Capps & Ansley, 1991) due to the manner in which some DoD agencies classify their polygraph results. For example if an examination has a minus three in any spot it is classified deceptive whether confirmed or not confirmed. A minus three (-3) does not often show up on a confirmed truthful examination because of the classification procedure. However, there were two exceptions among the 45 truthful sets in this study. They occurred when the first

examination employed the spot rule but subsequent examinations were scored as truthful.

Of the 86 confirmed deceptive cases investigated in this study, 24 employed the spot rule to make the deceptive determination. The spot rule, finding a -3 or more in one spot total was necessary because the overall score for all spots did not total -6 or above. Of those 24 cases using the spot rule, 18 (75%) involved the third relevant question, Question number 10. In these cases Question 10 may have been on the plus side, taking away points from the total minus score or on the minus side taking away points from the plus score. However, with a -3 total at the first relevant question, Question 5, or a -3 total at the second relevant question, Question 7, the whole set would have been called deceptive under the "spot rule." In addition to 18 cases where Question 10 necessitated the use of the spot rule, there were seven confirmed deceptive cases with a zero at Question 10.

All but two of the 24 confirmed deceptive cases above would have been called inconclusive without the spot rule. Those two would have been called truthful, becoming false negatives. But of those remaining 22 cases, nine had deceptive scores when Question 10 was excluded. It appears that the use of the spot rule was useful in the deceptive cases. However this data does not accurately portray the use of the spot rule for truthful subjects; because we could not estimate the effect due to the way in which the cases were classified.

In a previous study (Capps & Ansley, 1991) all confirmed polygraph examinations were numerically scored and evaluated based on the final score which summed all spots on all charts. This method of classification allows for truthful examinations with spot scores in the minus range. By classifying in this way, false positive errors that may have come into existence by use of the spot rule are identified. The classification used by those governmental agencies that employ the spot rule does not allow for this since a subject with a minus three in any one overall spot total is classified as deceptive (and filed accordingly) regardless of whether or not he is truthful.

In fact, since most applications of the spot rule involve Question 10 it may be prudent to correct the deficiency caused by Question 10 rather than employing the spot rule. A review of the actual questions used in these zone comparison polygraph tests discloses that Question 10 was often connected to the issue but was not related to Questions 5 and 7. That is to say that a person could have been deceptive to Questions 5 and 7 and truthful to Question 10, or vice versa. As a matter of fact, in at least two situations the very confession of the subject, later substantiated by additional actions, proved that the person who was guilty to

Questions 5 and 7 had not been guilty of Question 10. A need for Question 10 has not been justified for use in the zone comparison test. As a matter of fact there appeared to be deficiencies in the use of Question 10. For example, in two of the 86 confirmed deceptive cases the suspect was asked at Question 5 and 7 whether or not he stole the missing money and at Question 10 the suspect was asked if he knew where any of the money was spent. Both situations revealed that the suspect had stolen the money but the money had not been spent and was still where the suspect put it. Even so, both suspects were called deceptive to the entire test when they were deceptive to Questions 5 and 7 but truthful to Question 10.

Another issue that creates a classification problem is the question of what constitutes a confessions for confirmation of a deceptive call. In the previous study referred to (Capps & Ansley, 1991) two cases had admissions to theft of money from the place of business during the time frame the money was reported missing from the business. However, both admissions were to theft of money from the cash register not from the safe. The theft of money from the safe was the issue of the polygraph test. Under the classification system used by some governmental agencies this person would have been classified deceptive even though the admitted money theft had nothing to do with the missing money from the safe. This misclassification gives the appearance of greater utility, but for studies of validity, reliability, and evaluation of scoring rules, it is misleading.

Lykken (1981) and Patrick & Iacono (1991) have said that those subjects who confess after a polygraph test are unlikely to be representative of deceptive subjects in general, as bad liars may be easier to detect because they cannot bear the stress of the test, and the confessed liars do not include the type of guilty subjects that produce a false negative test. Those who have beaten a test, they say, are less apt to confess. However, those critics do not present any evidence to substantiate the suggestion that there is a "type of guilty subject" that produced false negative results, and there is no evidence that those who confess, or those who produce false negative results have any trait, state, or other quality that would differentiate them from subjects who confess. If those who do not confess are somehow different from those who do confess, it is possible, that their overall scores would be different. If those deceptive persons who do not confess are less reactive, then they might have minus scores closer to zero than those who do confess. That is not the case, as the overall scores for both groups were nearly identical. See Tables 14 and 15. We can find no evidence to support the supposition that those polygraph cases where the deceptive subject subsequently confesses are not representative of deceptive polygraph cases as a whole.

Habituation of chart reactions was not measured directly in this study. However, had the effect ben large, we considered the possibility that one effect of diminished responses might have rendered the accuracy of the third charts less than that of the first charts, and the total scores of third spots less accurate than the total scores of the first spots. That did not happen. Although not statistically significant, the trend was toward a greater accuracy in the third spot over the first spot. Excluding inconclusives, the third spot accuracy for truthful subjects was 100%, the first spot 96%; and for deceptive subjects the third spot accuracy was 84%, and the first spot was 75%. The trend for charts also favored the third over the first. For truthful subjects the third chart accuracy was 95%, the first chart 93%, and for deceptive subjects the third chart accuracy was 86% and the first chart was 80%. If these trends had been significant, we might have reasoned that habituation actually increased the differences in the magnitude and duration of responses to control/relevant pairs because of the responses accompanying deceptive answers, if Sokolov's (1963) observations about habituation are appropriate to this analysis. It is the basis for the numerical scoring; and the scores can go up even when habituation may be reducing the magnitude and duration of successive responses. Because there is no data in this study that firmly refutes the need to consider habituation in chart analysis, we shall need to find some better way to evaluate the habituation in polygraph testing.

What the Schools Teach

It should be noted that a telephone survey of APA accredited polygraph schools was conducted in April 1991 in which they were asked for the cutoff scores for zone comparison tests at two charts (if they allowed a conclusion with two charts), three charts, and four or more charts. They were also asked if they taught the spot rule which requires a DI conclusion for the whole test if any total spot score is -3 or more, and an inconclusive finding for the whole test if the total score of any spot is -2, -1, or zero. The results of the survey are in Table 16.

TABLE 1
Accuracy by Chart for Truthful Subjects

	All Truthful Cases (n. 45)			Excluding INCs	
	Correct	INC	Errors	Correct	Errors
Chart 1	40 (89%)	2 (4%)	3 (7%)	40 (93%)	3 (7%)
Chart 2	37 (83%)	2 (4%)	6 (13%)	37 (86%)	6 (14%)
Chart 3	39 (87%)	4 (9%)	2 (4%)	39 (95%)	2 (5%)

TABLE 2
Accuracy by Spot for Truthful Subjects

	All Truthful Cases (n.45)			Excluding INCs	
	Correct	INC	Errors	Correct	Errors
Spot 1	43 (96%)	0 (0%)	2 (4%)	43 (96%)	2 (4%)
Spot 2	42 (93%)	1 (2%)	2 (4%)	42 (95%)	2 (5%)
Spot 3	40 (98%)	1 (2%)	0 (0%)	40 (100%)	0 (0%)

TABLE 3
Accuracy with Deceptive Subjects by Chart

	All Deceptive Cases (n. 86)			Excluding INCs	
	Correct	INC	Errors	Correct	Errors
Chart 1	60 (70%)	11 (13%)	15 (17%)	60 (80%)	15 (20%)
Chart 2	68 (79%)	9 (10%)	9 (10%)	68 (88%)	9 (12%)
Chart 3	72 (84%)	2 (2%)	12 (14%)	72 (86%)	12 (14%)

TABLE 4
Accuracy with Deceptive Subjects by Spot

	All Deceptive Cases (n. 86)			Excluding INCs	
	Correct	INC	Errors	Correct	Errors
Spot 1	59 (69%)	7 (8%)	20 (23%)	59 (75%)	20 (25%)
Spot 2	76 (88%)	3 (4%)	7 (8%)	76 (92%)	7 (8%)
Spot 3	66 (77%)	7 (8%)	13 (15%)	66 (84%)	13 (16%)

TABLE 5
Accuracy with Truthful Subjects, Charts 1 and 2 Only

	All Truthful Cases (n. 45)			Excluding INCs	
	Correct	INC	Errors	Correct	Errors
+/-1	43 (96%)	0 (0%)	2 (4%)	43 (96%)	2 (4%)
+/-2	42 (95%)	1 (2%)	2 (4%)	42 (95%)	2 (5%)
+/-3	40 (89%)	3 (7%)	2 (4%)	40 (95%)	2 (5%)
+/-4	38 (84%)	6 (13%)	1 (2%)	38 (97%)	1 (3%)
+/-5	38 (84%)	6 (13%)	1 (2%)	38 (97%)	1 (3%)
+/-6	35 (78%)	9 (20%)	1 (2%)	35 (97%)	1 (3%)

TABLE 6
Accuracy with Deceptive Subjects, Charts 1 and 2 Only

	All Deceptive Cases (n. 86)			Excluding INCs	
	Correct	INC	Errors	Correct	Errors
+/-1	73 (85%)	5 (6%)	8 (9%)	73 (90%)	8 (10%)
+/-2	70 (81%)	10 (12%)	6 (7%)	70 (92%)	6 (8%)
+/-3	64 (74%)	17 (20%)	5 (6%)	64 (93%)	5 (7%)
+/-4	57 (66%)	25 (29%)	4 (5%)	57 (93%)	4 (7%)
+/-5	52 (60%)	31 (36%)	3 (4%)	52 (95%)	3 (5%)
+/-6	46 (53%)	38 (45%)	2 (2%)	46 (96%)	2 (4%)

TABLE 7
Accuracy with Truthful Subjects, All Charts

	All Truthful Cases (n. 45)			Excluding INCs	
	Correct	INC	Errors	Correct	Errors
+/-1	43 (96%)	0 (0%)	2 (4%)	43 (96%)	2 (4%)
+/-2	43 (96%)	0 (0%)	2 (4%)	43 (96%)	2 (4%)
+/-3	43 (96%)	1 (2%)	1 (2%)	43 (98%)	1 (2%)
+/-4	42 (93%)	2 (4%)	1 (2%)	42 (98%)	1 (2%)
+/-5	42 (93%)	2 (4%)	1 (2%)	42 (98%)	1 (2%)
+/-6	40 (89%)	4 (9%)	1 (2%)	40 (98%)	1 (2%)

TABLE 8
Accuracy with Deceptive Subjects, All Charts

	All Deceptive Cases (n. 86)			Excluding INCs	
	Correct	INC	Errors	Correct	Errors
+/-1	81 (94%)	0 (0%)	5 (6%)	81 (94%)	5 (6%)
+/-2	77 (90%)	4 (4%)	5 (6%)	77 (94%)	5 (6%)
+/-3	74 (86%)	7 (8%)	5 (6%)	74 (94%)	5 (6%)
+/-4	71 (83%)	10 (11%)	5 (6%)	71 (93%)	5 (7%)
+/-5	66 (77%)	16 (18%)	4 (5%)	66 (94%)	4 (6%)
+/-6	59 (67%)	25 (31%)	2 (2%)	59 (97%)	2 (3%)

TABLE 9
Accuracy with All Subjects, Charts 1 and 2

	All Cases (n. 131)			Excluding INCs	
	Correct	INC	Errors	Correct	Errors
+/-1	116 (89%)	5 (3%)	10 (8%)	116 (92%)	10 (8%)
+/-2	112 (85%)	11 (8%)	8 (6%)	112 (93%)	8 (7%)
+/-3	104 (79%)	20 (15%)	7 (5%)	104 (94%)	7 (6%)
+/-4	95 (73%)	31 (33%)	5 (4%)	95 (95%)	5 (5%)
+/-5	90 (69%)	37 (28%)	4 (3%)	90 (96%)	4 (4%)
+/-6	81 (62%)	47 (36%)	3 (2%)	81 (96%)	3 (4%)

TABLE 10
Accuracy with All Subjects, All Charts

	All Cases (n. 131)			Excluding INCs	
	Correct	INC	Errors	Correct	Errors
+/-1	124 (95%)	0 (0%)	7 (5%)	124 (95%)	7 (5%)
+/-2	120 (92%)	4 (3%)	7 (5%)	120 (94%)	7 (6%)
+/-3	117 (89%)	8 (6%)	6 (5%)	117 (95%)	6 (5%)
+/-4	113 (86%)	12 (11%)	6 (5%)	113 (95%)	6 (5%)
+/-5	108 (83%)	18 (14%)	5 (4%)	108 (96%)	5 (4%)
+/-6	99 (76%)	29 (22%)	3 (2%)	99 (97%)	3 (3%)

TABLE 11
Accuracy with Truthful Subjects, Spots 1 and 2 Only

	All Truthful Cases (n. 45)			Excluding INCs	
	Correct	INC	Errors	Correct	Errors
+/-1	43 (96%)	0 (0%)	2 (4%)	43 (96%)	2 (4%)
+/-2	43 (96%)	0 (0%)	2 (4%)	43 (96%)	2 (4%)
+/-3	42 (93%)	1 (2%)	2 (4%)	42 (95%)	2 (5%)
+/-4	39 (87%)	5 (11%)	1 (2%)	39 (98%)	1 (2%)
+/-5	37 (82%)	7 (16%)	1 (2%)	37 (97%)	1 (3%)
+/-6	35 (78%)	9 (20%)	1 (2%)	35 (97%)	1 (3%)

TABLE 12
Accuracy with Deceptive Subjects, Spots 1 and 2 Only

	All Deceptive Cases (n. 86)			Excluding INCs	
	Correct	INC	Errors	Correct	Errors
+/-1	71 (83%)	4 (4%)	11 (13%)	71 (87%)	11 (13%)
+/-2	69 (80%)	9 (11%)	8 (9%)	69 (90%)	8 (10%)
+/-3	66 (77%)	13 (15%)	7 (8%)	66 (90%)	7 (10%)
+/-4	64 (74%)	17 (20%)	5 (6%)	64 (93%)	5 (7%)
+/-5	61 (71%)	22 (25%)	3 (4%)	61 (95%)	3 (5%)
+/-6	48 (56%)	36 (42%)	2 (2%)	48 (96%)	2 (4%)

TABLE 13
Accuracy with All Subjects, Spots 1 and 2 Only

	All Cases (n. 131)			Excluding INCs	
	Correct	INC	Errors	Correct	Errors
+/-1	114 (87%)	4 (3%)	13 (10%)	114 (90%)	13 (10%)
+/-2	112 (85%)	9 (7%)	10 (8%)	112 (92%)	10 (8%)
+/-3	107 (82%)	15 (11%)	9 (7%)	107 (92%)	9 (8%)
+/-4	102 (78%)	23 (17%)	6 (5%)	102 (94%)	6 (6%)
+/-5	98 (75%)	29 (22%)	4 (4%)	98 (96%)	4 (4%)
+/-6	83 (63%)	45 (35%)	3 (2%)	83 (97%)	3 (3%)

TABLE 14
Average Chart Scores

	Confirmed (n. 86)	Unconfirmed (n. 50)
Chart 1	3.1	3.0
Chart 2	3.3	3.8
Chart 3	2.9	2.6
Total	9.3	9.4
Average	3.1	3.1

TABLE 15
Average Spot Scores

	Confirmed (n. 86)	Unconfirmed (n. 50)
Spot 1	1.9	1.5
Spot 2	4.4	4.2
Spot 3	3.0	3.7
Total	9.3	9.4
Average	3.1	3.1

TABLE 16
Scoring Rules for APA Accredited Courses

School or Course	2 Charts	3 Charts	4+ Charts	Spot Rule
Academy for Scientific Investigative Training	+9, -9	+13, -13	Add +/-4.5 per chart	no
American Institute of Polygraph	need 3	+6, -6	not addressed	no
Argenbright International Institute of Polygraph	need 3	+6, -6	+6, -6	no
Arizona School of Polygraph *	need 3	+6, -6	not more than 5 charts, +6, -6	no
Backster School of Lie Detection	+5, -9	+7, -13	not addressed, +9, -17 follows rule	no
International Academy of Polygraph	+9, -9	+9, -9	+9, -9	no
Maryland Institute of Criminal Justice	+6, -6	+6, -6	4 charts not used	yes
New York Institute of Security and Polygraph Sciences	need 3	+6, -6	4 charts not used	no
San Francisco Center for Polygraph Studies	need 3	+6, -6	+6, -6	no
University of Houston-Downtown Polygraph Program	+5, -9	+7, -13	+9, -17	no
Virginia School of Polygraph	+5, -7	score 2 best	not applicable	no
Western Oregon University *	+6, -6	+6, -6	+6, -6	no
Federal Schools				
Canadian Police College Polygraph Training School	need 3	+6, -6	+6, -6	no
Central Intelligence Agency	need 3	+6, -6	+6, -6	no
Department of Defense Polygraph Institute	need 3	+6, -6	+6, -6	yes

* Accreditation Pending

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ANALYSIS OF PRIVATE INDUSTRY POLYGRAPH CHARTS BY SPOT AND CHART TOTAL

By

Michael H. Capps and Norman Ansley

There are a myriad of ways to evaluate polygraph charts and no one seems to know which of these is the most effective. Where simple rules or procedures for evaluation were once followed, complex guidelines now exist. In the early days of what is now called polygraph testing, those who practiced detection of deception used a method of global analysis for evaluation of the physiological reactions on the polygraph charts. Using this method, the examiner usually observed the chart searching for what appeared to be the greatest change in the patterns recorded by the chart. A series of questions relevant to the issue to be covered by the test might be asked, commonly referred to as a peak of tension, or a series of relevant questions interspersed with irrelevant and other types of questions may have been posed to the subject.

In 1960, Backster developed a method of numerical scoring of polygraph charts intended to reduce subjectivity of examiner evaluation and create standards for chart interpretation (Backster, 1990). Since that time, numerous variations of scoring techniques have come into being. Experience suggests that some of the current rules proliferated by their authors are unfounded. Further, it is difficult to trace the evolution of scoring techniques because they change without documentation, and the change may be due to the personal experience of the examiner. The numerical scoring of the techniques raises the issue of how many points are assigned to a reaction and is complicated by the question of how many relevant questions must be scored to reach a determination of truth or deception. Not only is the number of questions an issue, but the number of charts necessary to render a result is also an issue.

Some prominent institutions teach three charts must be conducted to reach a conclusion (Argenbright, 1991; DoDPI, 1991). Some theories allow up to four repetitions for the question sequence without changing the cutoff scores (Schwartz, 1991) and others allow up to five (Kircher, 1983). Few address the possibility of obtaining enough data on two charts to render a decision (Backster, 1979).

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Those schools teaching a numerical scoring system for zone comparison testing generally teach that a series of charts are evaluated by spot on a seven-position scale (+3, +2, +1, 0, -1, -2, -3). This means that a question may receive a score of up to +/-3 or any score in-between for each spot in each component being evaluated. This would allow for a total of up to +/-9 at any spot total and up to a +/-27 per chart total assuming three relevant questions per chart. Many practitioners evaluate charts on a three-position scale (+1, 0, -1) which gives the same amount of weight to any reaction regardless of the degree of magnitude or duration of response. This would allow for a score of +/-1 or zero for each spot being evaluated or a total of up to +/-3 at any spot total and up to +/-9 per chart assuming three relevant questions per chart. An interesting note is that those who practice this scoring method use the same numerical cutoff scores in determining truth or deception as those who evaluate charts based on a seven-position scale.

The method of obtaining cutoff scores varies greatly in terms of spot totals and chart totals. For purposes of this study, a spot is the comparison between a pair of questions, one being relevant, the other a control. Under the Backster scoring system, the total amount needed to make a determination of truth or deception changes with the number of charts produced. For example, Backster's "you" phase examination has a cutoff of +5 for truthful and -9 for deception with two charts, but +7 for truthful and -13 for deception with three charts (Backster, 1979). However, the +/-6 amount remains constant under the system used by the Department of Defense Polygraph Institute and other schools as well. DoDPI has other rules. As an example, where an overall chart score of +54 with one spot total of zero will render a result of inconclusive and an overall chart score of +51 with one spot total of -3 will render a result of deception indicated. More often, the plus scores are above the cutoff at six, but remain low numbers.

This study investigated the procedures for chart analysis in terms of which cutoff scores rendered the highest accuracy with the highest utility. Also addressed was the number of charts necessary to supply sufficient data for the examiner to render a conclusion, as well as the optimum number of questions per chart.

Procedure

One hundred sets of confirmed polygraph charts were selected at random from the research files of a Department of Defense agency. These were not polygraph examinations conducted by a government agency however, three of the seven examiners who conducted the examinations are now federal examiners who had previously received their basic or advanced training by instructors

from DoDPI. The examiners received their training from three different polygraph schools. Each held a baccalaureate degree.

Fifty-two of the chart sets were confirmed deceptive and 48 of the chart sets were confirmed truthful. It has been suggested that confirmed polygraph charts are not representative of all polygraph charts (Patrick & Iacono, 1989) since only those charts that have sufficient numerical scores to indicate deception will be interrogated for a confession. This was not true of this group of charts in that 17 of the 100 sets were scored as inconclusive by the original examiners, but truth or deception was established by confession allowing for confirmation of the test. The examinations were all specific incident examinations using a control question technique. All deceptive examinations were confirmed by confession and all innocent examinations were confirmed by the confession of another.

The examinations were all conducted using Lafayette Polygraph Instruments that recorded thoracic breathing, abdominal breathing, electrodermal activity and cardiovascular activity. The examiners scored each of the examinations by question spot and by chart using a seven-position score.

Ninety-eight of the examinations contained three charts, two contained two charts. Ninety-six of the examinations contained three question spots, four contained two spots. The numerical scores of the charts were compiled by chart and sets of charts. The numerical scores were also totaled by spot for each chart and for each set of charts. Scores from the chart totals were averaged and so were the spot totals. Combinations of first and second charts from each set were scored and categorized as to truthful and deceptive. Combinations of charts one and three of each set as well as charts two and three of each set were scored and categorized in the same manner. These results were evaluated as to their effectiveness in determining truth or deception by plus (+) or minus (-) scores. Spot scores for each question spot comparison were also tabulated as to their effectiveness in determining truth or deception by plus (+) or minus (-) scores. These were put in tables according to position on each chart.

Cutoff scores for determining truth or deception were investigated to determine which cutoff would yield the highest accuracy, which would yield the greatest utility and to derive the optimum cutoff scores. This was accomplished by recording the number of true positives, false positives, true negatives, false negatives and inconclusives beginning with scores at zero. The results of a rule were examined that requires a determination of deception indicated if a score of -3 is assigned in any overall spot total and a determination of inconclusive is made if 0, -1 or -2 is assigned in any overall spot total.

Results

This study found that chart number one produced the most correct responses for the verified truthful subjects, and produced the least errors. Excluding inconclusives, chart number one produced 88.4% correct decisions for the truthful and 11.6% errors. This dropped to 73.8% correct decisions for the second chart with 26.2% errors. Chart number three accuracy increased somewhat over chart two to 80% correct decisions with 20% errors. Although there is an observed difference, it is not statistically significant at the .1 level (Chi Square Contingency Table test). Spot number one on each of the three charts produced the most correct responses and least errors for truthful subjects at 91.3% correct and 8.7% error. Spot number two fell sharply to 58.3% correct and 41.7% error. Spot number three increased accuracy over spot number two with 86.4% correct and 13.6% error (see Table 1). The spot differences are statistically different at levels will below the .01 level (Chi Square Contingency Table test).

TABLE 1
Analysis of Confirmed Truthful by Chart and By Spot
[n. 48 (with exceptions)]

	True Positive	Inconclusive	False Positive		True Positive	Inconclusive	False Positive
Chart 1	38	5	6	Spot 1	42	2	4
Chart 2	31	6	11	Spot 2	21	12	15
Chart 3	32	6	8	Spot 3	38	4	6

For the verified deceptive subjects, chart number two produced the most correct responses excluding inconclusives, with 98.1% correct, and the least errors at 1.9%. The first chart was correct in 93.9% of the deceptive decisions with 6.1% errors but the third chart was less often correct at 88.6%, with 11.4% errors. The difference is not statistically significant. Spot number two produced the most correct deceptive responses of the question spots with 98.1% correct, and the least errors at 1.9%. The first spot was correct identifying deception at 94.1%, with 5.9% errors. Spot three was correct identifying deception 88.4% of the time with 11.6% errors (see Table 2). Unlike the scores for the truthful subjects, the difference between the spot scores for the deceptive subjects was not significantly different.

TABLE 2
Analysis of Confirmed Deceptive by Chart and by Spot
[n. 52 (with exceptions)]

	True Negative	Incon-clusive	False Negative		True Negative	Incon-clusive	False Negative
Chart 1	46	3	3	Spot 1	48	1	3
Chart 2	51	0	1	Spot 2	51	0	1
Chart 3	39	5	5	Spot 3	38	5	5

When averaging the scores of each chart and each examination, the truthful had a mean score of +2.8 for chart one, +2.8 for chart two and +2.8 for chart three. No statistical difference was found. The overall average after summing three truthful charts was +8.5.

When averaging the scores of each deceptive chart and examination there was a mean score of -5.8 for chart one, -5.7 for chart two and -5.6 for chart three (see Table 3). Again, there was no statistical difference between charts. However there was a statistically significant difference between the overall average totals of the three charts with deceptive at -17.1 and +8.4 for truthful. This was highly significant.

TABLE 3
Average Chart Scores
(n. 298)

	Truthful	Deceptive
Chart 1	+2.8	-5.8
Chart 2	+2.8	-5.7
Chart 3	+2.9	-5.6
Average	+2.8	-5.7

When averaging the spot scores for truthful subject, the mean for spot one on each of the charts was +4.5, for spot two +1.3 and for spot three +2.5; with an overall average of +2.8. The spot scores for deceptive subjects was -5.5 for spot one, -7.0 for spot two and -5.0 for spot three; with an overall average of -5.8 (see Table 4). Again, the overall average for truthful subjects was significantly different from those of deceptive ones.

TABLE 4
Average Spot Scores
(n. 890)

	Truthful	Deceptive
Spot 1	+4.5	-5.5
Spot 2	+1.3	-7.0
Spot 3	+2.5	-5.0
Average	+2.8	-5.8

When the scores from charts were combined to determine the accuracy of decisions based on more than one chart, the accuracy of decisions, excluding inconclusives, was not significantly greater for three charts than for two charts of the truthful subjects or of the deceptive subjects (see Tables 5 and 6). Nor was there any statistically significant difference between the accuracy of two and three charts, excluding inconclusives, when the deceptive and truthful subjects were combined (see Tables 7 and 8).

Next tested was the effect of the rule that called for a determination of deception indicated for the whole test when any spot test was a -3, and a determination of inconclusive where a spot total was -2, or -1, or 0. This occurred in 22 of 48 confirmed truthful cases, resulting in different determinations than those originally rendered. The rule changed 14 of the 22 cases from truthful to inconclusive, and eight cases went from an incorrect decision to a correct decision.

Discussion

This study of 100 confirmed polygraph cases suggests that conducting three charts did not increase the accuracy of the polygraph examination over two charts. The data, however, is insufficient to reach significance. The utility cannot be determined until cutoff scores for two charts are established

TABLE 5
Charts 1 and 2 Combined

Truthful (n. 48)

	TP	INC	FP	Excluding Inconclusives TP	FP
±1	37 (77%)	4 (8%)	7 (15%)	84%	16%
±2	37 (77%)	6 (13%)	5 (10%)	88%	12%
±3	35 (73%)	8 (17%)	5 (10%)	88%	12%
±4	30 (63%)	13 (27%)	5 (10%)	86%	14%
±5	25 (52%)	21 (44%)	2 (4%)	93%	7%
±6	21 (44%)	26 (52%)	1 (2%)	96%	4%

Deceptive (n. 52)

	TN	INC	FN	Excluding Inconclusives TN	FN
±1	51 (98%)	0	1 (2%)	98%	2%
±2	51 (98%)	0	1 (2%)	98%	2%
±3	50 (96%)	1 (2%)	1 (2%)	98%	2%
±4	46 (88%)	5 (10%)	1 (2%)	98%	2%
±5	45 (87%)	7 (13%)	0	100%	0
±6	42 (81%)	10 (19%)	0	100%	0

TABLE 6
Charts 1 through 3 Combined

Truthful (n. 46) *

	TP	INC	FP	Excluding Inconclusives TP	FP
+1	38 (83%)	1 (2%)	7 (15%)	84%	16%
+2	37 (80%)	5 (11%)	4 (9%)	90%	10%
+3	34 (74%)	10 (22%)	2 (4%)	94%	6%
+4	33 (72%)	11 (24%)	2 (4%)	94%	6%
+5	32 (70%)	12 (26%)	2 (4%)	94%	6%
+6	31 (67%)	14 (30%)	1 (2%)	97%	3%

* Two sets of charts contained only two charts, therefore they were not included in this combination.

Deceptive (n. 52)

	TN	INC	FN	Excluding Inconclusives TN	FN
-1	52 (100%)	0	0 (0%)	100%	0%
-2	51 (98%)	1 (2%)	0 (0%)	100%	0%
-3	50 (96%)	2 (4%)	0 (0%)	100%	0%
-4	50 (96%)	2 (4%)	0 (0%)	100%	0%
-5	50 (96%)	2 (4%)	0 (0%)	100%	0%
-6	49 (94%)	3 (6%)	0 (0%)	100%	0%

TABLE 7
All Examinations with 1 and 2 Charts, Combined
(n. 100)

	Correct	INC	Error	Excluding Inconclusives Correct	Error
±1	88	4	8	92%	8%
±2	88	6	6	94%	6%
±3	85	9	6	93%	7%
±4	76	18	6	93%	7%
±5	70	28	2	97%	3%
±6	63	36	1	98%	2%

TABLE 8
All Examinations with Three Charts Combined
(n. 98)

	Correct	INC	Error	Excluding Inconclusives Correct	Error
±1	90 (92%)	1 (1%)	7 (7%)	93%	7%
±2	88 (90%)	6 (6%)	4 (4%)	96%	4%
±3	84 (86%)	12 (12%)	2 (2%)	98%	2%
±4	83 (85%)	13 (13%)	2 (2%)	98%	2%
±5	82 (84%)	14 (14%)	2 (2%)	98%	2%
±6	80 (82%)	17 (17%)	1 (1%)	99%	1%

TABLE 9
All Examinations, Spots 1 and 2 Combined
(n. 100)

	Correct	INC	Error	Excluding Inconclusives Correct	Error
±1	89	4	7	93%	7%
±2	84	11	5	94%	6%
±3	79	17	4	95%	5%
±4	76	22	2	97%	3%

* Table contains only through ±4 as a cutoff as that is the cutoff taught at DoDPI for a two spot zone.

versus those for three charts. Furthermore, the presentation of three similar relevant questions on each chart did not substantially increase the accuracy over the presentation of two similar relevant questions (see Tables 8 and 9). Although higher accuracy was obtained at higher cutoffs, the accuracy at the traditional +/-6 was only 3% higher, excluding inconclusives, than the accuracy at a mere +/-2. However, the inconclusive rate at +/-6 was higher than that at +/-2. Where rexamination is not possible the 11% lower cut-off scores became more practical.

The use of the "-3 spot rule" requiring a call of deception decreased the overall accuracy for truthful subjects. The "-2, -1. 0 spot rule" increased the inconclusive rate for truthful subjects. Based on this limited sample the effect of the spot rules appears counterproductive when applied to zone comparison tests.

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By

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TWENTY YEARS OF POLYGRAPH

By

Norman Ansley

The fourth issue of Volume 20 of the American Polygraph Association's quarterly journal, Polygraph (1991), completed a span of twenty years of publication. It all began with a modest proposal by APA President Raymond J. Weir, Jr. who wanted a scholarly journal in addition to the APA's Newsletter, which included topical papers on occasion. When I accepted appointment as Editor, Ray suggested editions of about thirty pages. I was also given the APA Newsletter to write and edit, a task previously performed by the APA Secretary. I was allowed to pay a typist for final manuscript preparation but all others involved in the process, including the Editor were to serve without compensation. A good friend, George Davis, accepted the position of Managing Editor for a year to get us started. Our first Associate Editor was Dr. Althea M.I. Wagman. Later in the first year Professor Clarence H.A. Romig joined us. In 1973 after George Davis resigned, Janet K. Pumphrey became the Managing Editor, and remains in that post to this day. In late 1974, Dr. Frank Horvath became an Associate Editor. Our current staff includes as Associate Editors: Gordon H. Barland, Ph.D., Lawrence S. Beaumont, J.D., Michael H. Capps, Frank Horvath, Ph.D., Murlene McKinnon, Ph.D., Clarence H.A. Romig, Althea M.I. Wagman, Ph.D., Richard S. Weaver, Heidi Herbold-Wootten, Dr. rer. nat., and William J. Yankee, Ph.D.

At the start I thought there would be plenty of articles; all they would need was a little editing. George Davis thought all he had to do was to deliver the manuscript to the printer with a list of addresses. We were really naive as to the amount of correspondence one issue generated. We knew nothing about advertising and had no idea that one quarter of our members would change addresses each year. We also learned, to the APA's considerable expense that members drop out without notice, and continued to get publications for almost a year without paying dues. We did know that the Post Office misrouted correctly addressed material, but the amount was and is shocking, and we pay to mail it out again. The biggest mistake the Post Office made was to return a member's mail to us marked "deceased." That was quite a surprise to the member and it took no small amount of humorous correspondence to get it straightened out. The Post Office can be stubborn about such things.

I found, as did all associate editors, that rewriting text, reorganizing material, checking references for accuracy, and supplying background information for rewriting, was quite time consuming. Although with experience, we have gotten better at editing, it still takes a lot of time. The worst job of all was, and still is, rejecting a manuscript. But, we recognize that most authors in our field don't need to publish, so we work harder than

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most editorial staffs to bring good material up to standard. Nevertheless, the editorial process is slow; it always has been, as the work is done by volunteers. Although we are up-to-date in our publishing schedule at this time, it is easy to see why some other journals are a year or more behind.

Sources and Scope

There are several problems that Polygraph doesn't share with many other journals. We have three very different sources of material: practicing examiners, scientists, and attorneys. Their writing styles differ considerably, requiring different editing, and different formats. In twenty years, Polygraph has published 508 feature articles. Of these, 191 (38%) were about polygraph topics such as chart interpretation, test techniques, instruments, applications, question formulation, cases, and polygraph programs. In that same twenty year span we published 159 (32%) articles about research, and 158 (31%) articles about law and legislation.

In addition to feature articles, Polygraph has carried bibliographies, book reviews, abstracts of scientific studies in other journals, excerpts from government reports, and matters about the American Polygraph Association's programs. APA members account for a large portion of our authors and co-authors. They wrote 367 (48%) of the 772 articles, reviews, abstracts, and bibliographies. Considering that most scientific articles had multiple authors, APA members actually authored over half the material we published.

Like other professional journals, most of our subscriptions are for our members and non-member practitioners. Scientists and attorneys account for only a few subscriptions. Libraries account for another group of subscribers, most through subscription agencies, and some through University Microfilms. The latter will grow as libraries face a lack of shelf space and smaller budgets.

Authors

A few of the 189 university affiliated scientists who contributed material were also APA members. Of the 159 articles they contributed on research, 125 (79%) were about validity or reliability. Of the 434 authors who were polygraph examiners from federal, state, local and private organizations, 367 (85%) were APA members. Of those 434 examiners, 213 (49%) were federal, 186 (43%) were private or corporate examiners, and 35 (8%) were local or state law enforcement examiners. By way of comparison, until passage of EPPA, private examiners accounted for slightly over half the APA membership, with law enforcement next, and federal membership the smallest. After EPPA, law enforcement became the largest, private next, and federal membership remained the

smallest. Table 1 displays the number of articles we obtained from different categories of authors in five-year blocks.

Table 1

Sources of Articles Published in Polygraph
1972-1991

Source	1972/1976	1977/1981	1982/1986	1987/1991	Total
	(Number of Articles)				
Federal examiners	55	61	40	57	213
Private examiners	55	53	43	35	186
Law Enforcement examiners	10	16	4	5	35
University authors	142	81	38	28	289
Other authors	28	16	2	2	48
Totals:	290	227	127	127	771

Types of Material

Over the twenty year history of Polygraph we published 508 feature articles, 137 abstracts, 31 bibliographies, 75 reviews, and 47 excerpts from reports. Of this, 176 were about techniques and instruments, 81 about chart analysis, 31 about question formulation, 82 about polygraph programs, 65 about applications of polygraph testing, and 30 describing specific crimes or cases. There were 34 articles on our history, 80 items about psychology, physiology, or culture, and 158 about laws and case law. There were 21 articles on our profession and APA activities, such as school accreditation, ethics, public relations, and program management. Interrogation as a separate topic received scant attention, with only three articles. Although many examiners in private practice offer paper-and-pencil integrity tests, that topic was addressed in only four articles, but a separate issue on this topic was a reprinting of the OTA report. In Table 2, there appear the number of articles in the various categories, sorted in five-year intervals.

Table 2

Major Topics of Articles Published in Polygraph
1972-1991

Topics	1972/1976	1977/1981	1982/1986	1987/1991	Total
Techniques & Instruments	55	74	31	16	176
Research Results	25	56	35	43	159
Law and Case Law	69	30	26	33	158
Chart Analysis	27	21	13	20	81
Polygraph Programs	23	10	29	20	82
Applications	8	21	17	19	65
Question Formulation	3	7	6	5	31
History	7	9	9	9	34
Crimes & Cases	5	14	5	6	30
APA Professional Matters	4	4	5	8	21
Psychology, Physiology, Culture	64	9	5	6	80

Distribution of Topics Over the Years

In the first five years we published more articles about law, psychology, and physiology than we did in later years. As we progressed in the sophistication of our features; material on law, psychology, and physiology was more often incorporated in articles about polygraph technique, instrumentation, or applied research.

In the early years there was more interest in the development of licensing laws and admissibility of polygraph results as evidence. When polygraph case law became of considerable interest, the APA began a quarterly law reporter, which continued for a number of years, and reduced the amount of legal text appearing in the journal. Now, the APA Law Reporter has been discontinued and legal text and case law has returned to the pages of the journal. Topics that we expect will see more attention in future articles are on digitized polygraph instruments and computer algorithms that analyze physiological responses. The distribution of our prime fare, articles and essays, has declined somewhat in number over the years. The number of other features seems to show no apparent trends. (See Table 3 which displays the distribution of the types of features in five-year intervals.)

Table 3

Distribution of Features in Polygraph
1972-1991

Features	1972/1976	1977/1981	1982/1986	1987/1991	Total
Essays and articles	153	176	97	82	508
Abstracts	42	35	22	38	137
Book Reviews	19	33	16	7	75
Excerpts of reports	11	3	23	10	47
Topical Bibliographies	8	3	6	14	21

One possible reason for the apparent decline in essays and articles may be due to the increase in the number of issues of Polygraph devoted to special topics. For instance, in recent years two entire issues were devoted to OTA reports, one to a Defense Department report, one to the calibration of instruments, one issue on the works of John E. Reid and another on the works of William M. Marston, and one issue devoted to three articles by APA members Joseph P. Buckley and Louis Senese about gender and race.

Pages of Text per Year

One advantage enjoyed by the Editor of Polygraph, not shared by many editors, is the ability to vary the number of pages per issue and per volume (year). These variations in text are largely based on the availability of material, as shown in Table 4. (Table 4 does not include pages devoted to advertisement.)

Table 4

Number of Pages Per Year in Polygraph
1972-1991

Year	Pages	Year	Pages	Year	Pages	Year	Pages
1972	271	1977	422	1982	355	1987	294
1973	368	1978	325	1983	394	1988	194
1974	460	1979	391	1984	371	1989	229
1975	403	1980	287	1985	371	1990	310
1976	360	1981	329	1986	324	1991	258
5-Year Totals	1,862		1,754		1,815		1,285

20 Year Total: 6,716 pages.

Other Publications of the APA

While working on the journals during the past twenty years we also produced 120 issues of the APA Newsletter, 15 editions of the Quick Reference Guide to Licensing and Limiting Laws, two editions of the bibliography Truth and Science, books entitled The Polygraph Story, The Polygraph Profession, Justice and the Polygraph, several years of the quarterly Polygraph Law Review, and eight issues of Polygraph Review. We have also arranged for the republication of the 1938 book, The Lie Detector Test, by William Moulton Marston.

The cost to members for their subscription to Polygraph and the APA Newsletter has been rather constant over the years, about 20% to 25% of dues. Although publication and mailing costs have gone up, they have been offset by an increase in subscriptions,

advertising, and the sale of back issues and sets in hard copy and microfilm.

Past, Present, and future

The journal has been the primary method for distributing information on professional developments, improved techniques, new applications, results of scientific research, and legal decisions. This publication activity has helped to create a permanent base of knowledge, a requisite for any profession. The journal has been, is, and will continue to be a visible activity of the APA, available for scrutiny and evaluation by members of related professions.

The journal increasingly serves as a repository for our history. The collection of 80 issues of Polygraph is already a source of reference for those who teach or conduct research and articles published in Polygraph are being cited with greater frequency each year in articles published in other journals in the United States and abroad.

The first twenty years of publication have provided a solid, informative and useful base of information about our field. It has also been a means of communication between examiners, scientists, and attorneys. In this way, our history has been preserved. The next twenty years will show an immense technological change in our field, and the journal will play a significant role in keeping our members well informed on these developments, and in serving as the archives of this data base.

APPENDIX

University Affiliation of Authors
1972 - 1991

American University
Auburn University
Baylor College of Medicine
Bryn Mawr College
Columbia University
Delta College
Florida International University
Fordham University
George Washington University
National Law Center
Harvard University
Hebrew University of Jerusalem
(Israel)
Indiana State University
Indiana University of Pennsylvania

Indiana University School of Law
Indiana University - Purdue University
at Fort Wayne
Jagellionian University (Poland)
Massachusetts Institute of Technology
Michigan State University
Northwestern College
Northwestern University
Northwestern University School of Law
Purdue University
San Jose State University
Stanford University
State University at Buffalo
University of Akron
University of Amsterdam (Holland)
University of British Columbia
University of Calgary (Canada)
University of California (Berkley)
University of California Los Angeles
University of California Santa Cruz
University of Cologne (Germany)
University of Florida
University of Georgia
University of Hawaii School of Law
University of Illinois
University of Illinois, Chicago Circle
University of Minnesota
University of New Brunswick (Canada)
University of New England (Australia)
University of North Carolina, Charlotte
University of Oregon
University of Ottawa (Canada)
University of Pennsylvania
University of South Florida
University of Southern Illinois
University of Utah
University of Virginia
Washington College of Law
Washington State University
Wayne State University
Western New England College of Law
Western Oregon State College

* * * * * *

WISCONSIN PASSES ACT SIMILAR TO EPPA, POLICE NOT EXEMPT

Assembly Bill 377 has been signed by Wisconsin Governor Thompson and has become Wisconsin Act 289. It became effective on May 14, 1992. In signing the Bill the governor said he was concerned that the bill did not have an exemption for law enforcement agencies, and said he would offer an amendment for that purpose with the budget bill in January 1993. If passed, it would become effective in early August 1993. The text of the Bill is as follows:

State of Wisconsin

1991 Assembly Bill 377 [Effective Date May 14, 1992]

1991 Wisconsin Act

AN ACT to repeal 111.381; to amend 111.31(4) and 111.84(1)(d); to repeal and recreate 111.37; and to create 111.373 and 111.91(2)(i) of the statutes, relating to restricting honesty testing in employment, granting rulemaking authority and providing penalties.

The people of the state of Wisconsin, represented in senate and assembly do enact as follows:

Section 1. 111.31(4) of the statutes is amended to read:

111.31(4) The practice of requiring employees or prospective employees to submit to a test administered by means of a lie detector, as defined in s. 111.37(1)(b), is unfair, the practice of requesting employees and prospective employees to submit to such a test without providing safeguards for the test subjects is unfair, and the use of improper tests and testing procedures causes injury to the employees and prospective employees.

Section 2. 111.37 of the statutes is repealed and recreated to read:

111.37 Use of honesty testing devices in employment situations. (1) Definitions. In this section:

(a) "Employer", notwithstanding s. 111.32(6), means any person acting directly or indirectly in the interest of an employer in relation to an employee or prospective employee. "Employer", notwithstanding s. 111.32(6) does not include the federal government.

(b) "Lie detector" means a polygraph, deceptograph, voice stress analyzer, psychological stress evaluator or other similar device, whether mechanical or electrical, that is used, or the

results of which are used, to render a diagnostic opinion about the honesty or dishonesty of an individual.

(c) "Polygraph" means an instrument that fulfills all of the following requirements:

1. Records continuously, visually, permanently, and simultaneously any changes in cardiovascular, respiratory and electrodermal patterns as minimum instrumentation standards.

2. Is used, or the results of which are used, to render a diagnostic opinion about the honesty or dishonesty of an individual.

(2) Prohibitions on Lie Detector Use. Except as provided in subs. (5) and (6), no employer may do any of the following:

(a) Directly or indirectly require, request, suggest or cause an employee or prospective employee to take or submit to a lie detector test.

(b) Use, accept, refer to or inquire about the results of a lie detector test of an employee or prospective employee.

(c) Discharge, discipline, discriminate against or deny employment or promotion to, or threaten to take any such action against, any of the following:

1. An employee or prospective employee who refuses, declines or fails to take or submit to a lie detector test.

2. An employee or prospective employee on the basis of the results of a lie detector test.

(d) Discharge, discipline, discriminate against or deny employment or promotion to, or threaten to take any such action against, an employee or prospective employee for any of the following reasons:

1. The employee or prospective employee has filed a complaint or instituted or caused to be instituted a proceeding under this section.

2. The employee or prospective employee has testified or is about to testify in a proceeding under this section.

3. The employee or prospective employee, on behalf of that employee, prospective employee or another person, has exercised any right under this section.

(3) Notice of Protection. The department shall prepare and distribute a notice setting forth excerpts from, or summaries of, the pertinent provisions of this section. Each employer that administers lie detector tests to its employees shall post and maintain that notice in conspicuous places on its premises where notices to employees and applicants for employment are customarily posted.

(4) Department's Duties and Powers. (a) The department shall do all of the following:

1. Promulgate rules that are necessary under this section.

2. Cooperate with regional, local and other agencies and cooperate with, and furnish technical assistance to employment agencies other than this state, employers and labor organizations to aid in enforcing this section.

3. Make investigations and inspections and require the keeping of records necessary for the administration of this section.

(b) For the purpose of any hearing or investigation under this section, the department may issue subpoenas.

(5) Exemptions. (a) Except as provided in sub. (6), this section does not prohibit an employer from requesting an employee to submit to a polygraph test if all of the following conditions apply:

1. The test is administered in connection with an ongoing investigation involving economic loss or injury to the employer's business, including theft, embezzlement, misappropriation and unlawful industrial espionage or sabotage.

2. The employee has access to the property that is the subject of the investigation under subd. 1.

3. The employer has a reasonable suspicion that the employee was involved in the incident or activity under investigation.

4. The employer executes a statement, provided to the examinee before the test, that sets forth with particularity the specific incident or activity being investigated and the basis for testing particular employees; that is signed by a person, other than a polygraph examiner, authorized legally to bind the employer; that is retained by the employer for at lest 3 years; and that identifies the specific economic loss or injury to the business of the employer, indicates that the employee had access to the property that is the subject of the investigation and describes the basis of the employer's reasonable suspicion that the employee was involved in the incident or activity under investigation.

(b) Except as provided in sub. (6), this section does not prohibit the use of polygraph tests on a prospective employee who, if hired, would perform the employer's primary business purpose if the employer's primary business purpose is providing security personnel, armored car personnel or personnel engaged in the design, installation and maintenance of security alarm systems and if the employer protects any of the following:

1. Facilities, materials or operations that have a significant impact on the public health, safety or welfare of this state or the national security of the United States, including facilities engaged in the production, transmission or distribution of electric or nuclear power; public water supply facilities; shipments or storage of radioactive or other toxic waste materials; and public transportation.

2. Currency, negotiable securities, precious commodities or instruments and proprietary information.

(c) Except as provided in sub. (6), this section does not prohibit the use of a polygraph test by an employer that is authorized to manufacture, distribute or dispense a controlled substance listed in schedule I, II, III, IV or V under ch. 161 if the test is administered to a prospective employee who would have direct access to the manufacture, storage, distribution or sale of the controlled substance or to a current employee if the test is administered in connection with an ongoing investigation of criminal or other misconduct that involves, or potentially involves, loss or injury to the manufacture, distribution or dispensing of the controlled substance by that employer and the employee had access to the person or property that is the subject of the investigation.

(6) Restrictions on Use of Exemptions. (a) The exemption under sub. (5)(a) does not apply if an employee is discharged, disciplined, denied employment or promotion or otherwise discriminated against on the basis of an analysis of a polygraph test chart or a refusal to take a polygraph test without additional supporting evidence. The evidence required by sub. (5)(a) may serve as additional supporting evidence.

(b) The exemptions under sub. (5)(b) and (c) do not apply if an analysis of a polygraph test chart is used, or a refusal to take a polygraph test is used, as the sole basis upon which an adverse employment action described in par. (a) is taken against an employee or prospective employee.

(c) The exemptions under sub. (5)(a) to (c) do not apply unless all of the following requirements are fulfilled:

1. Throughout all phases of the test the examinee is permitted to end the test at any time; the examinee is not asked questions in a manner that degrades, or needlessly intrudes on, the examainee; the examinee is not asked any question about religious beliefs or affiliations, political beliefs or affiliations, sexual behavior, beliefs or opinions on racial matters, or about beliefs, affiliations, opinions, or lawful activities regarding unions or labor organizations; and the examiner does not conduct the test if there is sufficient written evidence provided by a physician that the examinee is suffering from a medical or psychological condition or undergoing treatment that might cause abnormal responses during the testing.

2. Before the test is administered the prospective examinee is provided with reasonable oral and written notice of the date, time and location of the test, and of the examinee's right to obtain and consult with legal counsel or an employee representative before each phase of the test; is informed orally and in writing of the nature and characteristics of the tests and of the instruments involved; is informed orally and in writing whether or not the testing area contains a 2-way mirror, a camera or any other device

through which the test can be observed; is informed orally and in writing whether or not any device other than the polygraph, including any device for recording or monitoring the test, will be used; is informed orally and in writing that the employer or the examinee may, after so informing the examinee, make a recording of the test; is read and signs a written notice informing the examinee that the examinee cannot be required to take the test as a condition of employment, that any statement made during the test may constitute additional supporting evidence for the purposes of an adverse employment action under par. (1), of the limitations on the use of a polygraph test under this subsection, of the legal rights and remedies available to the examinee under this section and ss. 905.065 and 942.06. of the legal rights and remedies available to the examinee if the polygraph test is not conducted in accordance with this section and of the legal rights and remedies of the employer under this section; is provided an opportunity to review all questions to be asked during the test; and is informed of the right to end the test at any time.

3. The examiner does not ask the examinee any question during the test that was not presented in writing for review to the examinee before the test.

4. Before any adverse employment action, the employer interviews the examinee on the basis of the results of the test; provides the examinee written copies of any opinion or conclusion rendered as a result of the test, the questions asked during the test and the corresponding charted responses; and offers the examinee the opportunity to explain any questionable responses or to retake the examination or both. If the subsequent responses or the reexamination clarify any questionable responses, the results of the initial tests shall not be reported further and shall be removed, corrected or clarified in the employee's personnel records under s 103.13(4).

5. The examiner does not conduct and complete more than 5 polygraph tests on any day and does not conduct any polygraph tests that lasts for less than 90 minutes.

6. The test is administered at a reasonable time and location.

(d) The exemptions under sub. (5)(a) to (c) do not apply unless the individual who conducts the polygraph test satisfies all of the following requirements:

1. Maintains at least a $50,000 bond or an equivalent amount of professional liability coverage.

2. Renders no opinion or conclusion about the test unless it is in writing and based solely on an analysis of polygraph test charts, does not contain information other than admissions, information, case facts and interpretation of the charts relevant to the purpose and stated objectives of the test, and does not include any recommendation concerning the employment of the examinee.

3. Maintains all opinions, reports, charts, written questions, lists and other records relating to the test for at least 3 years after administration of the test.

(7) Disclosure of Information. No person other than the examinee may disclose information obtained during a polygraph test, except that a polygraph examiner may disclose information acquired from a polygraph test to the examinee or any other person specifically designated in writing by the examinee.

(8) Enforcement Provisions. (a) In addition to the rights, remedies and procedures under ss. 111.373 and 111.39, any employer who violates this section may be required to forfeit not more than $10,000.

(b) The rights, remedies and procedures provided by this section may not be waived by contract or otherwise, unless that waiver is part of a written settlement agreed to and signed by the parties to an action or complaint under this section.

Section 3. 111.373 of the statutes is created to read:

111.373 Local ordinances; collective bargaining agreements. Section 111.37 does not do any of the following:

(1) Prevent a county, city, village or town from adopting an ordinance that prohibits honesty testing, restricts the use of honesty testing to a greater extent than 2. 111.37 or provides employees with more rights and remedies with respect to honesty testing than are provided under s. 111.37.

(2) Supersede, preempt or prohibit provisions of a collective bargaining agreement that prohibit honesty testing, restrict the use of honesty testing to a greater extent than s. 111.37 or provide employees with more rights and remedies with respect to honesty testing than are provided under s. 111.37.

Section 4. 111.381 of the statutes is repealed.

Section 5. 111.74(1)(d) of the statutes is amended to read:

111.84(1)(d) To refuse to bargain collectively on matters set forth in s. 111.91(1) with a representative of a majority of its employees in an appropriate collective bargaining unit. Where the employer has a good faith doubt as to whether a labor organization claiming the support of a majority of its employees in appropriate collective bargaining unit does in fact have that support, it may file with the commission a petition requesting an election as to that claim. It is not deemed to have refusal to bargain until an election has been held and the results thereof certified to it by the commission. A violation of this paragraph includes, but is not

limited to, the refusal to execute a collective bargaining agreement previously orally agreed upon.

Section 6. 111.91(2)(i) of the statutes is created to read:

111.91(2)(i) Honesty testing requirements that provide fewer rights and remedies to employees than are provided under s. 111.37.

Section 7. Nonstatutory provisions; rule making and report to legislature. (1) Rule Making. The department of industry, labor and human relations shall submit in proposed form the rules required under section 111.37((4)(a) 1 of the statutes, as affected by this act, to the legislative council staff under section 227.15(1) of the statutes no later than the first day of the 4th month after the effective date of this subsection.

(2) Report to Legislature. Two years after the effective date of this subsection, the department of industry, labor and human relations shall submit a report to the chief clerk of each house of the legislature for distribution to the appropriate standing committees in the manner provided under section 13.172(3) of the statutes regarding the number of complaints filed and hearings held under section 111.37 of the statutes, as affected by this act, for each of the 2 years after the effective date of this subsection and comparing those figures to the number of complaints filed and hearings held under section 111.37, 1989 stats., for each of the 2 years preceding the effective date of this subsection.

Section 8. Initial applicability. This act first applies to honesty testing of employees covered on the effective date of this Section by a collective bargaining agreement, containing provisions that are inconsistent with this act, conducted on the date that that collective bargaining agreement expires or is extended, modified or renewed and first applies to honesty testing of other employees on the effective date of this Section.

* * * * * *

Catching Serial Killers

By

Lieutenant Earl W. K. James, J.D., Ph.D.
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Lansing, MI 48908-0242
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Book Reviewed by

John E. Douglas

In 1961, the national clearance rate for homicides was 92 per cent. In 1992, the clearance rate was only 64 per cent. With over 7,000 unsolved homicides law enforcement is facing a major war against violent crime. Contributing to the low clearance rate for homicides is the serial murderer. While no one can positively predict how many serial murderers exist in the United States, the FBI's National Center for the Analysis of Violent Crime (NCAVA), conservatively estimates there are approximately 50. Earl James' book Catching Serial Killers should be included in every detective's library. He shares his twenty-seven years of investigative experience that includes his personal involvement in serial murder investigations to include, John Norman Collins, aka, "The Michigan Murders".

Catching Serial Killers is an indepth review of cases studied by Earl James to include pitfalls in previous investigations as well as his personal observations and investigative suggestions to prevent similar mistakes from occurring the future.

Catching Serial Killers is not a "How to" book. There are already several books on the market that address how to conduct a homicide investigation. Earl James' book is, however, an excellent supplement that specifically targets the serial murders phenomenon.

It is worth reading.

The reviewer is a Unit Chief, Investigative Support Unit, Federal Bureau of Investigation Academy, Quantico, Virginia. [ed.]

CORPUS JURIS HUMOROUS

Edited by

John B. McClay and Wendy L. Mathews

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Corpus Juris Humorous is a compilation of humorous, extraordinary, outrageous, unusual, colorful, infamous, clever and witty reported judicial opinions and related materials dating from 1256 A.D. to the present. This entertaining volume contains over 280 hilarious and authentic judicial opinions extracted verbatim from the official records.

Each of the opinions is an original and unique expression of inspired judicial wit, creative humor and literary acumen, which is made all the more humorous because of its authenticity, containing genuine expositions of fact and law, and reflecting the court's actual analysis and rulings. The humor appears in forms as varied as the fact patterns of the cases presented: Incisive wit, dry sarcasm, obstreperous bombast, jocular exaggeration, doggerel verse, philosophic rumination, and more!

The opinions are drawn from a variety of judicial forums and from diverse historical and geographic locates, each having its origin in the English Common Law tradition, including the United States, Canada, and England. The cases span a period of more than 700 years, from the ancient English transcripts of the Northumberland County Assize proceedings of 1256 A.D. to the present day. The unifying constant in each of the opinions is the presence of humor in one form or another: From the stern "frontier" justice meted out by Richard C. Barry, Justice of the Peace for Tuolumne County, California, during the 1850-1951 gold rush era [replete with his notorious mis-spellings, grammatical anomalies and legally-questionable "roolings"] to the subtle, articulate wit of Sir Charles John Darling on the King's Bench Division of England's Supreme Court of Judicature; from the strident, piercing rhetoric of Justice Michael A. Musmanno [the infamous "dissenting" judge] of the Pennsylvania Supreme Court during the 1950's and 1960's to the Southern-rural, common-sense humor of Justice Logan E. Bleckley of the Georgia Supreme Court during the 1880's and 1890's.

Painstakingly researched and assembled over the last decade and a half, these opinions are indeed rare "gems" to be savored and enjoyed time and again. Nor is this merely a collection of humorous excepts. Rather, the cases are presented in an accurate and comprehensible form (with appropriate editing) to enable the reader to appreciate the fabric of judicial humor within a meaningful factual and legal context. The original language, grammar and spelling in the opinions have all been retained, notwithstanding any improprieties; and in many of the older cases, the grammatical errors and arcane usages constitute an integral part of the humor of the writing. The perfect book for all who enjoy excellent humor and the intriguing diversity of the law!

* * * * * * *