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RESEARCH IN ELECTRODERMAL BIOFEEDBACK WITH STIMULUS TESTS

By

Gordon H. Barland, Ph.D.

Abstract

Twenty subjects recruited by a newspaper advertisement were administered two polygraph tests of three charts each concerning which of five numbers they had picked. One test, the peak of tension (POT) test, was in a known sequence; the other, a guilty knowledge (GK) test, was in a pseudo-random sequence. The administration of the tests was counterbalanced for order. Half the subjects received audio SSR biofeedback, the other half did not. Of the 40 on-the-spot decisions made by the examiner, 85% were correct against a chance expectation of 20%. Five of the six errors occurred on the POT test for accuracy rates of 75% for the POT and 95% for the GKT, but the difference was not statistically significant. Biofeedback had no effect on accuracy of the field evaluation of the charts, but it did have a psychological effect. Following the tests, the feedback subjects increased their estimate of the accuracy of the polygraph, whereas the no-feedback control group did not.

Two electrodermal channels, DC and AC, were objectively scored by measuring the height of reactions to the nearest half millimeter. If the largest reaction occurred to the selected item, it was called a hit. There was no feedback effect, but both channels were significantly more accurate on the GK test than on the POT test, with hit rates of 80% and 35%, respectively, on the DC channel, for an overall accuracy of 58%. There was no significant difference in the hit rates for the DC and AC channels.

A new objective measure was developed: The difference in mm in the heights of two adjacent reactions. If the greatest decrease on a chart occurred following the reaction to the critical item, it was scored as a hit. As in the previous analysis, there was no feedback effect, and the SRR channels were significantly more accurate on the GK test than on the POT test, with hit rates of 75% and 40%, respectively, on the DC channel, for an overall accuracy of 58%.

The author is a member of the APA and a research psychophysiologist at the DoD Polygraph Institute. This research was conducted by Dr. Barland before he entered Federal service, under contract MDA904-83-M-1150.

Introduction

Two major variables were examined in this study: The effect of feedback and the effect of known versus unknown question sequence upon the accuracy of the numbers test in the psychophysiological detection of deception (PDD). The literature on the effect of feedback on PDD accuracy is too scanty and inconsistent to draw any firm conclusions, largely because of the wide variety of type of feedback used. These have included telling the subject how he did on one test to see what effect that had on a subsequent test (Ellson, Davis, Saltzman, & Burke, 1952; Gustafson & Orne, 1965), using a numbers test within the context of a control question test (CQT) to suggest to the subject how the CQT is likely to come out (Barland, 1972), and using false audio feedback on one chart to study the effect on the accuracy of subsequent charts (Suzuki, Watanabe, & Shimizu, 1969).

Golden (1971) found that audio GSR biofeedback increased the size of the GSR reactions in verified deceptive persons by 100% to 600%. However, his report does not contain any raw values, and contains obvious mathematical errors in some of the percentages reported. The lack of details in his report make it difficult to evaluate his results.

In a study quite similar to the current one, Stern, Breen, Watanabe, and Perry (1981) found that audio GSR feedback enhanced detectability as to which of five geometric figures each subject had selected. Two charts were obtained from each subject. The report does not indicate whether the subjects were informed of the sequence of questions or not, but the second chart was the same sequence as the first. Using only skin conductance, they obtained hit rates of 31% in the no feedback control group versus 69% in the feedback group, against a chance expectation of 20%. When personally relevant material was used (social security numbers), the hit rates were higher for both groups: 56% for the control group and 75% for the feedback group, against a chance figures, but not for the social security numbers.

The present study sought to replicate a portion of the Stern *et al.* study and to extend it by including two test formats: A known and an unknown sequence.

METHOD

Subjects

Twenty subjects were recruited through an ad placed in a daily newspaper, the *Salt Lake Tribune*, and were paid \$15 for about two and half hours of their time. Although no effort was made to control for gender, precisely half were males. The <u>Ss</u> ranged in age from 15 to 50, with a mean of 28.6 and a median of 26.0. Their education ranged from 10 to 18 years, with a mean of 13.2 and a median of 12.5. Eight of the subjects admitted to having had 1 to 15 arrests (median of 2.5), and seven had previously had a lie detector test. Of these, one had been given

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a voice analysis test for an employer, three had been given a pre-employment polygraph test for employers, two had been given specific polygraph tests for their employers, and one had been in Dr. Rovner's countermeasure study at the University of Utah. Five of the subjects were being treated by medical doctors, four had sought psychological or psychiatric help, and seven had taken prescription medication on the day of the polygraph test. None of these variables affected the accuracy of the examiner's decisions.

Procedure

All polygraph testing was conducted at the offices of a private polygraph consultant in Salt Lake City, Barland & Associates. The subjects were given appointments over the telephone. When each reported for testing, he was given a statement of consent. The first 75 minutes of the session were devoted to taking the self-administered California Personality Inventory (CPI). Upon completion of the CPI, each subject was shown into the polygraph room and was seated in a comfortable chair facing a black wall. The polygraph examinations were conducted by Gordon H. Barland, a field examiner trained at the U.S. Army Military Police School polygraph course in 1970.

A pretest interview lasting about 25 minutes was conducted by the examiner in which information was obtained regarding the <u>S's</u> educational, medical, psychiatric and polygraph history, together with his estimate of the accuracy of the polygraph technique in various situations. The rationale of the polygraph was explained to the <u>S</u> and he was shown a set of twenty 3- x 5-inch cards each of which contained one of five numbers ranging from two through six. Each number was equally represented, and the set of cards was shuffled prior to each selection. The <u>S</u> was instructed to select one of the cards, memorize the number, and then lay the card face down on the desk adjoining his chair. The examiner then told him that he would be asked a series of questions about what number was on the card he had selected. He was instructed to the beginning and ending of the sequence to absorb any orienting reactions and to serve as anchors for any "peak of tension."

Depending upon the predetermined, counterbalanced sequence, the first test administered was either a peak of tension (POT) test, in which the subject was told the sequence of the questions in advance, or it was a variant of the guilty knowledge (GK) test, in which the sequence of the questions was in a predetermined, random sequence not known to the subject in advance. The sequence was the same for all subjects. The psychological rationale for the test structure was explained to the subject in advance. Three charts were obtained, after which the number selected by the subject was verified and recorded by the examiner, but the subject was not told whether his number had been correctly detected. Instead, the examiner explained that a new number would now be selected, and a different test format would be administered in order to determine which format was the more accurate. A second deck of 20 3- by 5-inch cards was presented to the subject. The new deck had numbers ranging from 12 through 16, and had likewise been shuffled prior to each drawing. The second test consisted of the other test format (GK or POT), and again consisted of three charts.

On the POT test the number sequence went from one through seven on the first two charts, and was reversed on the third chart. On the GK test the sequence differed on each chart, but was the same for each subject. The only constraint on the predetermined random sequence was that no number could appear in the same position on more than one chart, other than the buffers. Following the test the examiner verified which number had been selected by the subject, debriefed the subject regarding his attitudes about the polygraph test, informed him of whether his numbers had been correctly detected on the polygraph, and paid him for his participation.

Half of the subjects received audio biofeedback on the SRR responsivity (AC mode) during both tests; the other half received no biofeedback. Assignment to the feedback condition was on a predetermined random basis, with the constraints that precisely 50% must receive feedback and half of each feedback group must received the POT test first.

Apparatus

A five-channel Lafayette Diplomat I polygraph was used to record thoracic respiration, finger blood volume by means of a photoelectric plethysmograph, cardiovascular activity of the upper arm by means of a cardio cuff placed on the dominant arm, and the skin resistance response. The SRR was recorded by a pair of electrodes placed directly on the volar surface of the 2nd and 4th fingers of the nondominant arm. No electrolyte was used. The SRR signal was split within the polygraph and displayed simultaneously on two channels: DC and AC. A lafayette Audio VCO, Model 76728, was connected to the output of the AC SRR to provide analog feedback to the feedback group.

Several types of data were collected, and will be reported in separate sections. Decisions based on inspection of the carts are reported first, following by objective analyses. Personality and attitudinal variables are reported last.

ACCURACY OF EXAMINER DECISIONS BASED ON VISUAL INSPECTION OF THE CHARTS

All Channels & All Charts Combined

Each set of three charts was given an on-the-spot appraisal by the examiner in the presence of the subject. All physiological channels of all related charts were inspected, and a decision made by the examiner as to the number selected by the subject. The examiner's decision was recorded in writing prior to having the subject reveal the selected number. This analysis was made while the charts were being obtained, and then all three charts were inspected for more than 30 seconds at the end of the test. The examiner looked at all channels on all charts, weighing each according to clarity and his previous experience regarding the effectiveness of the various channels. The examiner looked primarily at the two SRR channels (particularly the DC channel).

He then inspected the cardio channel. Only when the decision was not obvious at this point did he look at respiration and the plethysmograph.

On the POT test the examiner looked both at the magnitude of phasic responses and at baseline shifts. The latter included looking at the location of the highest point (peak) of the systolic strokes in the cardio channel and the highest point (lowest resistance) on the SRR-DC channel. The examiner also looked for changes in the frequency and magnitude of SRR reactions, primarily a shift from labile to nonlabile.

On the GK test the examiner look primarily for the largest single reaction on the chart, primarily in the SRR channels, supplemented by the other channels.

The examiner made a definite decision on each test given to every subject. Because the examiner knew beforehand that every subject had selected one of the numbers, the examiner forced a decision in those few cases where the charts were not clear.

Table 1 shows the number of hits and misses for each feedback group and each test type.

Table 1

Accuracy of Examiner's on-the-spot Decisions

			1st Test			2nd Test	
	Hits	Misses	Total		Hits	Misses	Total
NF POT	3	2	5	NF GK	5	0	5
NF GK	5	0	5	NF POT	4	1	5
FB POT	4	1	5	FB GK	5	0	5
FB GK	4	1	5	FB POT	4	1	5

Both Tests

	Hits	Misses	Total
No Feedback	17	3	20
Feedback	17	3	20
РОТ	15	5	20
GK	19	1	20
lst Test	16	4	20
2nd Test	18	2	20
Overall	34	6	40

Of the forty decisions, 34 (85%) were correct, against a chance expectation of eight (20%). The six errors were evenly split between the feedback and nofeedback subjects. Five of the six errors occurred on the known sequence (POT) test. That difference was not significant (binomial test, p = .219, 2-tailed). Four of the six errors occurred on the subjects' first test, two on the second. That difference was not significant.

Table 2 shows the interaction between feedback and test type.

Table 2

Effect of feedback on accuracy by test type (all charts combined)

	POT 7	GK Test					
	Hits	Misses	Total		Hits	Misses	Total
NF	7	3	10	NF	10	0	10
FB	8	2	10	FB	9	1	10
Total	15	5	20	Total	19	1	20

Neither the type of test nor feedback had any significant effect on the accuracy of the polygraph. The polygraph was accurate far beyond chance levels with both types of test regardless of whether feedback was given or not.

Accuracy of Individual Channels on Individual Charts

Several months after the examinations were conducted, the charts, identified only by the subject's file number, the type of test format, and the chart sequence number (this identified whether the chart was from the 1st or 2nd test, and whether it was the 1st, 2nd, or 3rd chart within that test), were reevaluated by visual inspection of individual channels by the same polygraph examiner. The 120 charts (20 subjects, 2 tests, 3 charts each) were reviewed according to a predetermined randomization schedule generated by a computer. The channels not being evaluated were covered by a double thickness of paper to avoid biasing the evaluator. The respiratory tracing was evaluated first on all 120 charts. Then the cardio channel was evaluated on all charts, followed by the plethysmograph, the SRR-AC and finally the SRR-DC.

The primary aspect analyzed by the examiner was the location of the single largest reaction (ignoring the two buffer items) and secondly any shifts in lability. On POT charts, the examiner also looked for peaks and other baseline shifts, especially on the SRR and cardio channels. Because the examiner knew that every subject was lying to one and only one item on each chart, he forced a decision in those cases where the chart was not clear. Thus no inconclusives category was used.

Respiration

Respiration was not effective, overall, in determining which number the subjects selected. Of 120 charts in which chance detection is 20%, one would expect 24 hits by chance alone. The respiratory channel had 23 hits (19% accuracy). Nor was there any feedback effect. The no feedback (NF) control group had 10 hits whereas the feedback (FB) group had 13 hits, against a chance expectation of 12 hits.

Each subject was administered two tests of three charts each. The number of hits on each of the six charts, summed over the 20 subjects without regard for feedback group or test format, would be expected to be 4 by chance alone. The number of hits for respiration for the six charts were 2, 4, 5, 2, 5, and 5, respectively. The number of hits required for significance at the .05 level (1-tailed) is 8. It will be noticed that the first chart on the two tests had the least number of hits. The hit rate for the three charts on both tests combined (4, 9, & 10) were not significantly different from each other, nor were they significantly above chance expectation of 8. Thus, there was no discernible chart effect in the respiratory channel.

There was a significant test effect. Table 3 shows the accuracy of the respiratory tracing on the POT and GK tests.

Table 3

Accuracy of the respiratory tracing on the POT and GK tests

	Hits	Misses	Total
РОТ	5	55	60
GK	18	42	60
Total	23	97	120

The respiration was only 12% accurate on the POT test, but was 30% accurate on the GK test, against a chance expectation of 20%. The difference was significant (Chi square = 7.745, df = 1, p < .01; phi = .25). The hit rates for respiration was significant above chance on the GK test (binomial test, z = 1.775, p = .038, 1-tailed).

In view of the significant test-type finding, the respiratory results on the GK test were analyzed separately. Respiration was not significantly accurate on any of the three charts (4, 7, & 7), although it approached significance on the second and third charts (binomial test, z = 1.3975, p = .0867, 1-tailed). The differences between charts were not significant, nor was there any feedback effect or test-sequence effect (*i.e.*, whether the GK test occurred as the first or second test.)

Plethysmograph

The plethysmograph was marginally accurate in determining which number the subjects selected. Of 120 charts, one would expect 24 hits by chance alone. The plethysmic channel had 32 hits (27% accuracy) (binomial test, z = 1.71, p = .0436, 1-tailed). There was no significant feedback effect (19 hits on the NF group as compared to 13 hits on the FB group), nor was there any test-type effect (17 hits on the POT versus 15 on the GK test). There was no sequence effect (14 hits on the first test versus 18 hits on the second). The hit rates across the six charts, summed across all 20 <u>Ss</u> were 5, 5, 4, 3, 8, and 7 respectively. The hit rate was significant on the second chart of the second test (binomial p = .0322, 1-tailed), and approached significance on the final chart (binomial p = .0867, 1-tailed). The hit rates across the three charts of both tests combined were 8, 13, and 11, which was significant on chart 2 (z = 1.779, p = .038, 1-tailed). As with respiration, the first chart tended to be the least accurate, but this finding was not significant.

Cardio

Surprisingly, the cardio was somewhat less accurate than the plethysmograph, with only 30 hits out of 120 charts (25% accuracy) versus 32 for the plethysmograph. The cardio was not significantly accurate overall (z = 1.255, p = .105 1-tailed), but there was a test-type difference. As shown in Table 4, it was more accurate with the POT test than with the GK test.

Table 4

Accuracy of the cardio with the POT and GK tests

	Hits	Misses	Total
РОТ	20	40	60
GK	10	50	60
Total	30	90	120

Although the cardio was not accurate with the GK tests, the 33% accuracy with the POT test was significant (z = 2.421, p = .0078 1-tailed). The difference in accuracy between the POT and GK tests approached significance (chi square = 3.6, df = 1, p = .0578, phi = .17).

The cardio had hit rates of 7, 3, 5, 4, 9, and 2 across the six charts. Of these only the second chart on test 2 produced significant accuracy (binomial test, p = .01, 1-tailed), although the first chart on test 1 approached significance. When the two tests were combined, the hit rates across charts were 11, 12, & 7, of which only the second chart approached significance (z = 1.383, p = .083 1-tailed). There was no significant difference among the three charts. The test sequence had no effect: Half of the hits occurred on the first chart, and half on the second.

SRR-AC (Auto mode GSR)

The SRR-AC channel had 73 hits out of the 120 charts (60.8% accuracy), which was highly significant z = 11.06, p < .00001). The hit rates on the six charts summed across the 20 subjects were 12, 12, 11, 14, 14, and 10, respectively, where 8 is significant at the .05 level. When the two tests were combined, the hit rates were 26, 26, and 21, respectively. There was no significant difference amongst the 3-chart hit rates.

There was no feedback effect. The SRR-AC channel had 34 hits with the NF control group, versus 39 hits with the FB group.

The SRR-AC channel was more accurate with the GK test than it was with the POT test. There were 27 hits (45% accuracy) with the POT test, versus 46 hits (77% accuracy) with the GK test (chi square = 11.332, df =1, p = .00076, phi = .31). The accuracy was highly significant with both tests (z = 4.68 on the POT test data, p < .00002 1-tailed).

There was no significant test sequence effect; there were 35 hits on the first test versus 38 on the second.

SRR-DC (Manual mode GSR)

The single most accurate channel evaluated by inspection was the SRR-DC channel, although the difference between it and the SRR-AC channel was not significant. SRR-DC had 77 hits out of the 120 charts (64.2% accuracy), which was highly significant (z = 11.98, p < .00001). The hit rates on the six charts summed across the 20 subjects were 12, 12, 12, 13, 14, and 14, respectively, all of which were highly significant. When the two tests were combined, the hit rates were 25, 26, and 26, respectively, against a chance expectation of 8.

There was no feedback effect. The SRR-DC channel had 38 hits with the NF control group, versus 39 hits with the FB group.

The SRR-DC channel was more accurate with the GK test than it was with the POT test. There were 31 hits (52% accuracy) with the POT test, versus 46 hits (77% accuracy) with the GK test. The accuracy was highly significant with both tests (Z = 5.97 on the POT test data, p < .00002 1-tailed), and the difference in the hit rates between the two tests was also significant (chi square - 7.104, df = 1, p = .0077; phi = .24). The difference in the hit rates on the POT test by the two electrodermal channels (31 hits by the DC channel versus 27 by the AC channel) was not significant.

There was no significant test sequence effect; there were 36 hits on the first test versus 41 on the second.

All channels combined

After each individual channel had been separately analyzed, each chart was again inspected, with all channels being inspected simultaneously. The difference between this analysis and the on-the-spot analysis made by the examiner was that in this analysis each chart was looked at individually, without reference to the other two charts in the series. As in the on-thespot analysis, the examiner weighted each channel according to its clarity and his confidence in each channel based upon his experience with it.

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This analysis resulted in 71 hits out of the 120 charts (59.2% accuracy), which was somewhat (but not significantly) less than the 73 by the SRR-AC channel and the 77 by the SRR-DC channel. The hit rates on the six charts summed across the 20 subjects were 12, 13, 12, 11, 12, and 11, respectively, all of which were significant. When the two tests were combined, the hit rates were 23, 25, and 23, respectively, all of which were significant.

There was no feedback effect. There were 32 hits with the NF control group versus 39 hits with the FB group. There was no test sequence effect. There were 37 hits on the first test versus 34 on the second.

The GK test was significantly more accurate than the POT test, with hit rates of 44 (73%) and 27 (45%), respectively (chi square = 8.83, df = 1, p = .003; phi - .27). The accuracy of chart analysis was highly significant with both tests (z = 4.68 on the POT test data, p < .00002 1-tailed).

Accuracy of individual channels across charts

It was considered impractical to inspect individual channels on all 3 charts simultaneously when the other channels were blocked out, especially on the Gk test in which the question sequence was different on each chart. However, an analysis was made of those cases in which the inspection of a given channel on individual charts yielded the same conclusion on at least two of the three charts regarding which number the subject had selected. Even if respiration was not significantly accurate on individual charts in isolation, it would be reasonable to expect that the accuracy should increase in those cases in which respiration agreed with itself on two or three charts. Unlike the previous analyses, the number of cases in this set of analyses varies, since those cases in which decisions based on a given physiological channel were difference on every chart were considered inconclusive, and were discarded. Table 5 summarizes the data channel by channel.

Table 5

Accuracy of individual channels agreeing on at least two of three charts

		NF	Feed	dbao <u>F</u> I	ck 3	P	Test	t Ty Gł	vpe C	18	Sequent	<u>1000</u>	e id	To deci	tal sions	Binomial
	Incl	H	<u>– M</u>	H	- M	<u> </u>	<u>- M</u>	H	<u>– M</u>	H	<u>– M</u>	H	<u>– M</u>	H	<u>– M</u>	
Resp. %	20 50	2 22	7	3 27	8	0 0	10	5 50	5	3 20	12	2 40	3	5 25	15	.3897
Plethys %	18 45	5 42	7	2 25	8	3 27	8	4 36	7	3 27	8	4 36	7	7 32	15	.1314
Cardio %	12 30	4 27	11	5 38	8	6 43	8	3 21	11	5 38	8	4 27	11	9 32	19	.0853
SRR-AC %	8 20	11 79	3	15 83	3	11 69	5	15 94	1	12 92	1	14 74	5	26 81	6	<.00001
SRR-DC %	9 22	12 86	2	14 82	3	11 73	4	15 94	1	12 80	3	14 88	2	26 84	5	<.00001
All chan %	7 18	10 71	4	15 79	4	10 62	6	15 88	2	13 81	3	12 71	5	25 76	8	<.00001

Respiration

The respiration was significantly more accurate with the GK test than with the POT (Fisher exact probability test, p = .01), and the respiratory hit rate of 5 hits and 5 misses with the GK test was significant (binomial p = .0328, 1=tailed). None of the other differences were significant.

Plethysmograph

None of the hit rates or comparison was significant. The plethysmic channel approached significant levels of accuracy with the NF group (binomial p = .0726, 1-tailed).

Cardio

The six hits out of 14 decisions with the POT test was significantly better than chance (binomial p = .0437, 1-tailed), but none of the other differences were significant. The POT was not significantly better than the Gk test. The accuracy of the cardio on the first test (5 hits out of 13 decisions) approached significance (binomial p = .0991, 1-tailed).

SRR-AC

The auto-mode GSR showed highly significant hit rates regardless of the feedback group, the test type, and the test sequence. None of the differences among the groups on those three variables was significant.

SRR-DC

The manual mode GSR results were the same as the auto-mode GSR: Highly significant hit rates on all major variables, but no significant differences among the groups on those three variables.

All Channels Combined

Like the SRR channels, the hit rates for all channels combined across charts were highly significant regardless of the feedback group, test type, and test sequence, with no significant differences among the groups on those three variables. The greater accuracy on the GK test (15 hits with two misses as compared to 10 hits and 6 misses on the POT test) approached significance (Fisher exact probability test, p = .093).

Table 6 presents no new information, but is included for ease of reference. It is derived from Table 5 and lists the number of hits, misses and inconclusives for the various channels, generally arranged in order of increasing accuracy. The term "all combined" refers to the analysis in which all five channels were inspected together on each individual chart, and there was agreement in at least two of the three charts on a given test.

Table 6

Number of Hits, Misses, and Inconclusives by Channel When there is Agreement on 2 or more Charts out of 3

Channel	Hits	Misses	% Accy	Inconcl.	Total
Respiration	5	15	25%	20	40
Cardio	8	20	29%	12	40
Plethys.	8	14	36%	18	40
SRR-DC	27	4	87%	9	40
SRR-AC All	28	4	88%	8	40
Combined	25	8	76%	7	40

Polygraph, 26 (1) (1997).

Accuracy of the Objective Analysis

Only the two SRR channels were objectively scored. The height of each reaction was measured to the nearest half of a millimeter. On the known sequence POT test a reaction was considered valid if it started within a window extending from 1 second after question onset to 5 seconds after the answer. On the unknown sequence GK test the window extended from 1 second after question onset to 5 seconds after the answer. In those cases in which the pen hit the upper pen stop during a reaction, the height was extrapolated where reasonably possible. Extrapolation was more often possible in the AC mode than with the DC channel.

SRR-DC (Manual mode GSR)

mm Pen Deflection

The SRR-DC channel was highly accurate, with 65 hits out of the 120 charts (54% accuracy) (z = 9.24, p < .00001 1-tailed). The hit rates on the six charts summed across the 20 subjects were 9, 11, 8, 14, 11, and 12, all of which were significant. When the two tests were combined, the hit rates across the three charts summed across the 20 subjects were 23, 22, and 20, respectively, against a chance expectation of 8.

There was no feedback effect. The SRR-DC channel had 35 hits with the NF control group, versus 30 hits for the FB group.

The SRR-DC channel was more accurate with the GK test than it was with the POT test. There were 20 hits (33% accuracy) with the POT test, versus 45 hits (75% accuracy) with the GK test. The accuracy was highly significant with both tests (z = 2.42 on the POT test data, p < .0078 1-tailed), and the difference in the hit rates between the two tests was significant (chi square = 19.33, p = .00001; phi = .40).

There was no significant test sequence effect. There were 28 hits (47% accuracy) on the first test versus 37 hits (62% accuracy) on the second test (chi square = 2.148, p = .2854 2-tailed).

The mean reaction on each item in mm was determined for each item across all three charts on each test. The mean reaction showed a significant hit rate. There were 23 hits (58% accuracy) on the 40 tests (z = 5.61, binomial p < .0001). There was no feedback effect, with 13 hits on the NF control group versus 10 hits on the FB group. There was no test sequence effect, with 11 hits on the first test and 12 on the second. However, there was a significant test-type effect. There were 7 hits (35% accuracy) on the POT test versus 16 hits (80% accuracy) on the GK test (chi square = 6.547, p = .01; phi = .23). The SRR-DC (mm pen excursion) was only marginally accurate on the POT tests, with 7 hits against a chance expectation of 4 (z = 1.3975, p = .081 1-tailed).

SRR-DC (Kilohms)

The examiner tends to compensate for individual differences in lability by adjusting the SRR amplifier gain to obtain optimum sized reactions. This not only tends to obscure individual differences in responsivity, but also dampens out trends such as habituation of responses across charts. Each chart contained a 1k and 5k calibration signal, by means of which the mm of pen deflection for each reaction were converts to kilohms. Figures 1 and 2 show the size of reactions in kilohms across the items on each chart and across charts for the POT test when it occurred as the first of the two tests (fig. 1) and when it was the second test (fig. 2). BBuf is the buffer placed at the beginning of the chart. Pre is the mean size of the non-critical items which occurred prior to the critical item. There were from zero to four pre-critical items possible, depending upon where the critical item was situation within the question sequence. When the critical item occurred as the very first item after the buffer, the buffer item was counted again as the "mean pre-critical item." Crit is the critical item. Post is the mean size of the post-critical items excluding EBuf, the ending buffer. As with the pre-critical item, there could be anywhere from zero to four post-critical items. When there were no such items, the ending buffer was counted both as the ending buffer and the mean post-critical item.

Detection of the critical item in either a POT or GK test can be thought of as a problem in signal detection. For best detectability, the item profile should show the greatest possible difference in size between the critical item (the signal) and the pre- and post-critical items (the noise). The profiles depicted for the POT test in fig. 1 show rather poor discrimination, particularly by the FB group on the 1st and 3rd charts, and by the NF control group on the 2nd chart. The lability of the NF group on the 1st chart through the critical item is striking. The key factor identifying the critical item in that group is the dramatic reduction in reactivity following the critical item. The profile of the FB group on the first chart of the POT test suggests that the effect of the feedback may have been to distract them from the lie detection task. Note the general superiority of the NF control group on the POT test when it was the 1st test.

Figure 2 shows the profile of the items across charts for both the NF and FB groups when the POT test was the second test. Note that the scale on the vertical axis on the second test is twice as big as that on fig. 1. It can be seen that one of the effects of feedback was to retard the habituation observed in the NF group across the three charts of the first test and from test I to test II. Note that when the POT test was the 2nd test, the FB group tends to exhibit the better signal-to-noise ratio, a reversal of the trend when it was the 1st test.

Figures 3 and 4 show the item profiles for the GK test when it was the 1st and 2nd test, respectively. Note that when the GK test was the first test, the NF control group was clearly superior to the feedback group on all three charts. When the GK test was the 2nd test administered, the NF group was again superior on all three charts, but not by as much. Again note that the vertical axis is on a different scale in figures 3 and 4.



Fig. 1. Effect of feedback on magnitude of SRR-DC reactions across item type and charts on the POT test when it was the first test.



Fig. 2. Effect of feedback on magnitude of SRR-DC reactions across item type and charts on the POT test when it was the second test.



Fig. 3. Effect of feedback on magnitude of SRR-DC reactions across item type and charts on the GK test when it was the first test.

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Fig. 4. Effect of feedback on magnitude of SRR-DC reactions across item type and charts on the GK test when it was the second test.

Because of the dramatic habituation which occurred on the second test, separate ANOVAs were conducted on the item profiles for the first test and the second test. On the first test, collapsed across test type and feedback condition, the first chart had significantly larger reactions (kilohms): Chart 1 had mean reactions of 6.78 kilohms, versus 3.70 and 3.64 kilohms for charts 2 and 3, respectively (F(2,32) = 4.54, p = .018). There was no feedback effect (F(1,16) = 3.309, p = .084), but there was an item effect, as shown in Table 8 (F(4,64) = 15.321, p < .001). There was also a significant feedback by items interaction (F(4.64) = 3.961, p = .006). The GK test produced a much sharper contrast between the critical item and the pre- and post-critical items (F(4,64) = 4.477, p = .003).

Table 8 shows the values (in kilohms) for the items by feedback and for the items collapsed across items.

Table 8

Effect of feedback on size of reactions (kilohms) on item type on the first test

Item Type

	BBuf	Pre	Crit	Post	EBuf
NF	9.18	6.8	11.47	2.14	1.31
FB	4.52	3.51	4.70	1.80	1.65
Grand Mean	6.85	5.16	8.08	1.97	1.48

On the second test there likewise was no feedback effect. There was no chart effect, but there was a highly significant items effect (F(4,64) = 6.123, p < .001) and a marginal test type by items interaction, with the GK test providing a better signal-to-noise ratio (F(4,64) = 2.583, p = .044). Table 9 shows the interaction between feedback and item type for the second test; only the grand means were significantly different from each other.

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Table 9

Effect of feedback on size of reactions (kilohms) on item type on the second test

Item Type

		BBuf	Pre	Crit	Post	EBuf
N	IF	1.65	1.48	3.38	0.37	1.40
F	В	2.48	2.20	4.50	1.42	2.20
Grand M	lean	2.07	1.84	3.94	0.90	1.80

SRR-DC (mm difference)

The size of the reaction to a stimulus in mm was subtracted from that of the preceding reaction. A positive score indicates that the second reaction was smaller than the preceding one; a negative difference indicates that the second reaction was the larger. If the largest positive difference on a chart occurred immediately following the critical item (that is, a large reaction on the critical item was followed by a small reaction to the next item), it was scored as a hit; otherwise it was scored as a miss.

The SRR-DC (mm difference) measure was highly accurate, with 69 hits out of the 120 charts (58% accuracy) (z = 10.16, p < .00001 1-tailed). The hit rates on the six charts summed across the 20 subjects were 12, 11, 10, 13, 10, and 13, all of which were significant. When the two tests were combined, the hit rates across the three charts summed across the 20 subjects were 25, 21, and 23, respectively, against a chance expectation of 8.

There was no feedback effect. The SRR-DC (mm. diff.) measure had 35 hits with the NF control group, versus 34 hits for the FB group.

The SRR-DC (mm diff.) measure was more accurate with the GK test than it was with the POT test. There were 24 hits (40% accuracy) with the POT test, versus 45 hits (75% accuracy) with the GK test. The hit rate was highly significant with both types of test (Z = 3.71 on the POT test data, p < .0001 1-tailed), and the difference in the hit rates between the two types of test was significant (chi square = 13.64, p = .0002; phi = .34).

There was no significant test sequence effect. There were 33 hits (55% accuracy) on the first test versus 36 hits (60% accuracy) on the second test.

Mean mm difference

The mean difference in reaction for each consecutive pair of items was determined for each item across all three charts on each test. There were 28 hits (70% accuracy) on the 40 tests, which was highly significant (z = 7.71, p .0001). There was a tendency for the measure to be more accurate with the GK test. There were 11 hits with the POT test versus 17 on the GK test (chi square - 2.98, p = .084). The hit rate with the POT test was significant (binomial p = .0005).

There was no feedback effect. Of the 28 hits, 15 occurred with the NF control group and 13 with the FB group. There was no test sequence effect; precisely half of the hits occurred on the first test.

SRR-AC -- Auto mode GSR

mm Pen Excursion

The SRR-AC channel was highly accurate, with 64 hits on the 120 charts (53% accuracy) (z = 9.01, p .0001 1-tailed). The hit rates on the six charts summed across the 20 subjects were 9, 11, 10, 13, 10, and 11, all of which were significant at the .05 level or better. When the two tests were combined, the hit rates across the three charts summed across the 20 subjects were 22, 21, and 21, respectively, against a chance expectation of 8.

There was no feedback effect. The SRR-AC channel had 33 hits with the NF control group versus 31 hits for the FB group.

The SRR-AC channel was more accurate with the GK test than it was with the POT test. There were 22 hits (37% accuracy) with the POT test, versus 42 hits (70% accuracy) with the GK test. The accuracy was highly significant with both tests (z = 3.07 on the POT test data, p = .0011 1-tailed), and the difference in the hit rates between the two tests was significant (chi square = 12.087, p = .0005; phi = .32).

There was no significant test sequence effect. There were 30 hits (50% accuracy) on the first test versus 34 hits (57% accuracy) on the second.

The mean reaction on each item in mm was determined for each item across all three charts on each test. The mean reactions showed a significant hit rate. There were 25 hits (62% accuracy) on the 40 tests (z = 6.522, p < .0001). There was no feedback effect, with 14 hits on the NF control group and 11 hits on the FB group. There was no test sequence effect, with 12 hits on the first test and 13 on the second. The mean SRR-AC reaction was more accurate on the GK test than on the POT test. There were 9 hits (45% accuracy) on the POT test versus 16 hits (80% accuracy) on the GK test (chi square = 3.84, p = .05; phi = .31). The mean SRR-AC reaction in mm was significantly accurate on the POT test, with 9 hits against a chance expectation of 4 (z = 2.52, p = .006 1-tailed).

mm Difference SRR-AC

The SRR-AC (mm difference) measure was highly accurate, with 74 hits out of the 120 charts (62% accuracy) (z = 11.30, p .0001). The hit rates on the six charts summed across the 20 subjects were 15, 11, 11, 14, 13, and 10, respectively, all of which were significant. When the two tests were combined, the hit rates across the three charts summed across the 20 subjects were 29, 24, and 21, respectively, against a chance expectation of 8.

There was no feedback effect. The SRR-AC (mm diff.) measure had 39 hits with the NF control group versus 35 hits with the FB group.

The SRR-AC (mm diff.) measure was more accurate with the GK test than it was with the POT test. There were 29 hits (48% accuracy) with the POT test versus 45 hits (75% accuracy) with the GK test. The hit rate was highly significant with both types of test (z = 5.33 on the POT test data, p .0001), and the difference in the hit rates between the two types of test was significant (chi square = 7.93, p = .005; phi = .26).

There was no significant test sequence effect. There were 37 hits (62% accuracy) on each the first and second tests.

There was no real difference in accuracy between the AC and DC modes. There were 69 hits on the 120 charts with the SRR-DC (mm diff.) measure versus 74 hits for the SRR-AC (mm diff.) measure.

Mean SRR-AC (mm diff)

The mean SRR-AC (mm diff) reactions across the three charts of each test was calculated. There were 28 hits (70% accuracy) on the 40 tests (binomial p < .0001). There was no feedback effect, with 15 of the hits occurring on the NF control group versus 13 on the FB group. There was no test sequence effect, with 15 of the hits occurring on the first test. Interestingly, there was no test-type effect, either, with 12 hits on the POT test versus 16 hits on the GK test. There was absolutely no difference in accuracy between the AC and DC modes; each had 28 hits (70% accuracy).

Accuracy of the Lykken Scores

The magnitude of all SRR-DC reactions in mm of pen excursion was measured, and the reactions to the five possible numbers on each chart were ranked (1 = largest). Lykken's (1959) scoring system was used, such that if the largest SRR-DC reaction occurred to the selected number, a score of 2 was assigned; if the second largest reaction occurred to the selected number, it was scored as a 1; otherwise it was scored as a zero. The largest possible score on each 3-chart test was six. Test scores of 4, 5, or 6 were scored as hits; scores of 0 through 3 were scored as misses.

The Lykken scoring produced a hit rate of 26 (65%) out of 40 tests, which was significantly above chance expectation of 8 (binomial p < .00001). There was no feedback effect. Of the 14 errors, 6 were on the NF group, 8 on the FB group. There were possible test-type and test-sequence effects. The GK test tended to be more accurate than the POT test. Of the 26 hits, 10 occurred on the POT test (50% accuracy) and 16 on the GK test (80% accuracy). Both rates were well above chance (binomial p = .0026 for the POT test). Analysis of the hit/miss rates by test types approached significance (chi square = 2.747, df = 1, p = .097). Table 10 shows the distribution of Lykken scores by test types.

Table 10

Distribution of Lykken scores by test types

Frequency of Lykken scores

	0	1	2	3	4	5	6	Total
РОТ	4	1	2	3	5	4	1	20
GK	0	0	2	2	5	0	11	20
Tot	4	1	4	5	10	4	12	40

It is interesting to note that 11 of the 12 scores of 6 occurred on the GK test, as against a chance expectation of 7.38 (16/26ths of the hit rate).

The second test tended to more accurate than the first one. Ten of the 26 hits occurred on the 1st test, 16 on the 2nd test (chi square = 2.747, df = 1, p = .097).

PERSONALITY VARIABLES

The California Personality Inventory (CPI) was administered to all subjects immediately prior to the polygraph tests. The correlation between the scores on the 18 CPI scales and the Lykken scores were later calculated. Three different sets of Lykken scores were used in the correlations: Those for the GK test, the POT test, and the total scores for both tests. Table 11 displays the correlation coefficients.

TABLE 11

Correlation between CPI scores and Lykken scores

CPI Scales

<u>Do</u> <u>Cs</u> <u>Sy</u> <u>Sp</u> <u>Sa</u> <u>Wb</u> <u>Re</u> <u>So</u> <u>Sc</u> <u>To</u> <u>Gi</u> <u>Cm</u> <u>Ac</u> <u>Ai</u> <u>Le</u> <u>Py</u> <u>Fx</u> <u>Fe</u> GK -.44-.09-.18-.30-.15-.05-.07-.31 .14-.08 .16-.23-.26 .00-.28-.27-.18 .11 POT .22 .24 .17 .02-.03 .10 .41 .52 .17 .33-.03 .25 .32 .36 .29 .31 .08 .30 Both-.19 .10-.01-.23-.15 .12 .26 .14 .24 .18 .10 .00 .03 .28 .01 .02-.04 .32

For a df of 19, the correlation is significant at the .05 level when r = .43 and at the .01 level when r - .55. Thus the Dominance scale (Do) was inversely correlated with the Lykken scores on the GK test. That is, the less dominant subjects tended to be easily detected on the GK test. The Socialization (S0) scale was correlated with the Lykken scores on the POT test. Finally, the Responsibility (Re) scale tended to be correlated with the POT scores, suggesting that the more responsible subjects may tend to be readily detected.

In a *post hoc* analysis, the 7 highest and 7 lowest subjects on each of the 18 CPI scales were determined. The middle 6 subjects were dropped from this analysis in order to sharpen the contrast between the high and low scorers. The number of errors on these two groups based on the Lykken scores were determined. It was assumed that if the personality variable being examined had no effect on the error rate, the number of errors in the high/low groups should be equal. A binomial test as made to test the observed error rate in the two extreme groups against the predicted rate. A 2-tailed test was considered appropriate here, for in most cases there is little

reason to expect most of the errors to occur with one group or the other. The only scale which approached significance on this analysis was the femininity (Fe) scale. The High-Fe group had 1 error versus 7 errors in the Low-Fe group (p = .070 2-tailed). That is, the polygraph was less accurate with the more masculine subjects when the Lykken scores were used.

EFFECT OF FEEDBACK ON POLYGRAPH ATTITUDES

Before and after the tests all subjects were questioned about how accurate the polygraph was and what they thought their chances were having their numbers detected. A Wilcoxin matched-pairs signed-ranks test was conducted on their pre- and post-test attitudes. The NF control group did not increase their estimate of the polygraph accuracy as a result of their experience with it (T = 7.5, n = 7), whereas the FB group did (T = 0, n = 9; p < .01, 2-tailed).

Similarly, the NF control group did not increase their previous estimate of the chances that the examiner had detected their numbers (T = 13, n = 7), whereas the FB group did (T = 1, n = 10; p < .01, 2-tailed).

Although feedback did not in fact increase the actual accuracy of the chart interpretation, it made the subjects perceive the polygraph as being more accurate.

Emotions experienced during the polygraph tests

During the debriefing following the second exam, the subjects were asked what emotion(s) they experienced during the polygraph tests. They were asked to report on a scale of 0 to 10 how much of each of 11 emotions or attitudes they felt while the tests were in progress. Table 12 lists the results ranked according to the mean value, from most to least.

Table 12

Degree of emotions experienced during the polygraph tests

Emotion	Mean	Median
Curiousness	8.0	9.0
Tension	6.2	6.0
Nervousness	5.5	4.5
Excitement	5.3	5.5
Thrill	4.5	5.0
Fear	3.4	2.0
Guilt	2.8	0.5
Boredom	2.5	2.0
Irritation	2.4	1.5
Embarrassment	1.6	0.5
Anger	0.6	0.0

It is apparent that there was a wide gamut of emotions reported by the various subjects. The most commonly reported feelings dealt not with raw emotions but more along the dimension of arousal: Curiosity, tension and nervousness.

DISCUSSION

Feedback Effect

One of the main findings of this study was that feedback did not affect the accuracy of the polygraph. This negative result was robust. There was no feedback effect regardless of whether the charts were scrutinized by the examiner at the time of the examination, whether scrutinized channel by channel, chart by chart, or whether the electrodermal channels were objectively measured. Neither the hit/miss ratios derived from objective measurement of the response amplitudes, nor hit/miss ratios based upon ranked data showed any feedback effect.

The only possible feedback effect was completely unanticipated: The feedback tended to *reduce* the absolute magnitude of electrodermal responsivity, as measured in kilohms. One might have predicted that the FB subjects should show larger responses than the nonfeedback control group because of a presumed increase in their level of arousal and emotional involvement in their detectability.

It is not known why feedback tended to reduce the size of the electrodermal reactions. It was only long after data collection had been completed that this finding was discovered. Consequently, no attempt was made to debrief the subjects about how the feedback was perceived by them. One possibility is that the feedback group attended to the feedback signal so much that they did not focus as much on the deception aspect of the study. That is, the task of attending to the feedback signal may have to some degree distracted them from the content of the test questions. One bit of evidence supporting this hypothesis is that most of the FB/NF comparisons of the hit rates showed a slight tendency to favor the no feedback group. Also, one of the findings of the short pilot study was that the subjects found it difficult to interpret the feedback tone. Consequently, during the study more effect was taken to explain the signal to them and to give them about 20 or 30 seconds of practice listening to it prior to the selection of the number. It may be that the increased briefing on the signal was still inadequate for proper comprehension.

The effect of reduced response magnitude should not affect the accuracy of the polygraph in the field, for the examiner adjusts the sensitivity of the GSR amplifier for each subject individually. Indeed, that is likely the reason why this effect was not discovered until the data were objectively quantified. The accuracy of the examiner's original decisions based upon chart scrutiny showed no decrease in accuracy in the feedback group; precisely half of the 6 errors occurred with each group. That feedback did not affect the accuracy of the polygraph test was surprising, given the relatively large feedback effect reported by Stern, Breen, Watanabe, & Perry (1981). Although their Experiment 1 used a paradigm quite similar to the present study, there are several factors which may have contributed to the different outcomes.

Stern and his colleagues do not describe how their subjects were briefed on the feedback signal. The briefing could have been qualitatively or quantitively different. Secondly, their subjects consisted of college students taking an introductory psychology course, whereas the present study used subjects recruited from the Salt Lake City population. There were thus obvious differences in the levels of criminal behavior, age, education, and intelligence. Our population was likely more heterogeneous along many dimensions. While this would tend to obscure the measurement of potential feedback effects in given subpopulations, this heterogeneity more closely resembles the subjects likely to be given polygraph tests in real-life situations.

When the subjects in the study by Stern *et al.* lied about which of five geometric figures they had selected, there were 5 hits out of 16 tests in the no feedback control group, for an accuracy rate of 31% (chance was 20%; the hit rate was not significant at the .05 level). The feedback group had 11 hits out of 16 tests (69% accuracy). Stern *et al.* do not specify whether the subjects knew the question sequence or not on the first of the two charts which were administered regarding the geometric figures, but the question sequence on the second chart was the same as the first. In the present study, the equivalent hit rates are the data from the mean SRR-DC (mm pen deflection). For the known sequence POT test, we had 4 hits out of 10 tests on the no feedback subjects (40% accuracy; binomial p = .12) versus 3 hits out of 10 with the feedback subjects (30% accuracy; clearly not significant). For the unknown sequence GK test, we had 9 hits with the nonfeedback group (90% accuracy; p < .0001) versus 7 hits with the feedback group (70% accuracy; p < .0009). Although Stern and his colleagues found a significant feedback effect, we did not.

Another possible difference between the Stern *et al.* study and this study is the clinical interaction between the examiner and the subject between charts. They did not describe what interaction, if any, occurred between charts; presumably it was minimal. In the present study, the examiner had each subject look (again) at the selected number prior to every chart. The examiner stressed the importance of remembering the number, explaining that the procedure was, in a sense, a test of the subject's memory. This procedure may have tended to obscure any potential feedback effect by heightening the ego involvement of both groups. To the extent that this might have been the case, this factor of high ego involvement would also be expected to be present in real life examinations. This hypothesis would require additional research to verify.

Effect of Test Type

Two types of test formats were employed in this study: The peak of tension test and the guilty knowledge test. The two tests are closely related. Every effort was made to make the two tests equivalent except for one difference: With the POT test the subject knew the question sequence in advance. The psychological principle upon which the test is based is the peak of

tension. With the GK test the subjects did not know the question sequence in advance. The psychological principle involved in this test is that of recognition.

It would therefore be expected that baseline shifts, particularly in the cardio and SRR-DC channels would be important in the interpretation of the POT test, whereas response magnitude would be the single most important factor in the interpretation of the GK tests. This supposition was borne out, at least in part. The objective analysis of the SRR channels consistently showed a greater hit rate with the GK test. This is not surprising, for the objective analyses dealt exclusively with response magnitude, ignoring tonic changes.

What was more remarkable was the trend in the decisions based upon chart scrutiny made by the polygraph examiner. Five of the six errors occurred on the POT test. While not statistically significant, the trend was quite strong. It could be that the presence of numerous types of interpretive criteria in several channels could reduce the accuracy of decisions in those cases where they are not internally consistent. Although the charts have not been reviewed from that perspective, there is some indirect, weak support for that hypothesis. When all 5 channels were reviewed simultaneously on each individual chart in isolation from the two other charts in the series, there were 71 hits, compared with 77 hits when the SRR-DC channel was reviewed in isolation from the other channels. The data shown in Table 6 similarly indicate that in those cases where two or more of the charts agreed with each other, analysis of all channels on the chart was less accurate (though not significantly) than either SRR channel alone: 79% accuracy for all channels combined compared with 87% and 88% accuracy for the SRR channels in isolation.

The fact that the GK test had significantly higher accuracy rates than the POT test on nearly every analysis suggests that the element of not knowing what item is coming next may be an important factor affecting accuracy. With the control question test (CQT) all questions are normally reviewed word for word, but the sequence of the questions is normally not known by the subject on the first chart or two. Some examiners shift the order of presentation of questions from one chart to the next on a CQT precisely in order to keep the subject form anticipating the next question. This study suggests that that is a good practice.

However, a related question raised by this study is whether it is a good practice to preview the questions word for word in the first place. One of the criticisms levelled against the relevant-irrelevant (RI) test is that when it is being used in criminal investigations, many examiners do not review the questions word for word. That practice has bene criticized on the grounds that some questions are very simple and easily recognized and understood by the subject, whereas other questions on the same chart may be more complex and require thought processing before the subject knows how to answer. The elements of surprise, uncertainty, possible ambiguity or embarrassment, and thought processing would presumably contaminate the interpretation of the charts and would almost certainly reduce the accuracy of the test, according to those critics. The present study, however, suggests that the very uncertainty inherent in the question sequencing of the RI administered in criminal investigations may make the test more accurate with the deceptive subject. An important consideration in raising this question is that the present study did not include any "innocent" subjects, and the effect of the element of uncertainty with them has not been studied at all.

Effect of chart sequence

Although there was a significant decrease in the absolute magnitude of reactions across charts, this did not have any general effect on the accuracy of decisions. In those measures, such as respiration and plethysmograph, in which the accuracy was very marginal, that accuracy seemed to peak in the middle of the second test. This was a rather isolated finding, however, and does not seem to have any practical significance. Feedback reduced the habituation across charts observed in the NF control group.

Effect of test sequence

The subjective impression of the subjects was clearly that the second test seemed to be "harder to beat," regardless of whether it was the POT or GK test. This was unexpected. My experience in debriefing criminal suspects who have confessed their guilt is that they generally felt that their lies showed up the most on the first chart because they felt so unfamiliar with the polygraph and were thus ill-prepared to beat the test. As the test continued, they became more accustomed to the procedure and felt more in control and less threatened.

When the subjects in this study were debriefed on this matter, those who had first had the GK test explained that the second test was harder to beat because they knew when their lie was coming and that knowledge seemed stressful. Those subjects who had first had the POT test, on the other hand, tended to explain the difficulty of the second test as being that they never knew when their lie was going to occur, and thus felt incapable of preparing themselves for it.

The subjects' physiological reactions on the second test tended to support their psychological perception. Although it never attained statistical significance, there seemed to be a slight trend for the second test to be somewhat more accurate in both the field evaluations and in the objective analyses. Nonetheless, this finding offers some support for the practice of switching to a new test format and continuing the testing when the first test is inconclusive.

Effectiveness of physiological measures

Respiration

Respiration was generally ineffective, except with the GK test, in which it was 30% accurate. This channel was difficult to evaluate because the tracings were often irregular, and there seemed to be numerous reactions throughout many of the charts. Faced with a plethora of apparent reactions, the examiner was faced with the task of determining the most significant one. Because of the great number of possible respiratory patterns, this was a difficult task. Thus, the respiratory channel in this study can be criticized along the same grounds that electrodermal activity was criticized in the 40 years following its introduction in the 1930's: It appeared to be

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too sensitive, and most of the apparent reactions were not significant; the signal-to-noise ratio was poor.

In view of the number of apparent reactions, it would seem useful to do a *post hoc* analysis in which the various reactions would be categorized and frequency counts made. The number of hits and misses for each of the reaction types would be made to determine the relative significance of the various respiratory patterns. It is just as important to know which respiratory patterns are unrelated to deception as is the converse.

It is distressing to note that in the 10 instances in which there was agreement in the respiratory channel on 2 of the 3 charts in the POT test, not once was that consensus correct!

Because other researchers have found respiration to be effective with other test formats, there likely is an interaction between its effectiveness and the test format, as was the case in this experiment, in which it was effective with the GK test but not with the POT test. There could also be an interaction between respiratory effectiveness and the school from at which the examiner is trained. It could be that the federal polygraph school does not teach the interpretation of respiration in as much detail as some of the other schools. The fact that the experimenter is a graduate of the federal school, and that his experience in interpreting respiration has long made him question its effectiveness relative to other channels could have resulted in a self-fulfilling prophecy. This could be assessed by having the charts interpreted blindly by examiners who place great confidence in usefulness of respiration, and who have graduated form various schools. Care would have to be taken to have the other channels blocked out, as was the case in this experiment.

The plethysmograph

The classic plethysmograph reaction is a uniphasic, downward reaction with recovery upward. The plethysmograph manufactured on the early Lafayette polygraphs consistently produced such reactions. At that time the pickup was attached by velcro wrap. The current models are attached by a clothespin type device. These seem to produce a variety of patterns. The two most common ones are a uniphasic upward reaction with a downward recovery limb, and a biphasic reaction consisting of an initial upward reaction, followed by a downward reaction, and an upward recovery.

In this study most of the reactions were of the uniphasic upward type, although a number of biphasic reactions were observed. The upward reaction indicates that the finger was becoming momentarily darker, which in turn suggests vasodilation. It is not known whether there actually was peripheral vasodilation--which would contradict the fight-or-flight concept upon which the fear of detection theory depends--or whether the reaction pattern is an artifact of some aspect of the recording methodology, such as the tightness with which the sensor is clamped to the finger.

The fact that there was no test-type effect with the plethysmograph (17 hits on the POT test versus 15 hits on the GK test) suggests that baseline shifts were not an important reaction

criterion with the POT test. The charts have not been evaluated with that specific question in mind, however. It would make a useful follow-up study to have every channel evaluated again, categorizing the frequency of the various reaction criteria for each channel, in order to determine which specific criteria are most closely associated with the lies to the critical items, while not occurring to the noncritical items. It would be expected that certain criteria would be more accurate with one type of test than the other. It would also be of interest to assess the accuracy of plethysmic recordings obtained from the forehead. While it requires a little more effort to attach it to that location, the psychological impact that such a recording site would have is worthy of investigation.

The cardio

It is surprising that the cardio was not significantly accurate, overall, in view of its popularity within the polygraph field and the reliance placed on it by so many examiners. Although it was significantly accurate with the POT tests, suggesting that baseline shifts are effective criteria when the question sequence is known, its accuracy of 30% was much poorer than expected. The same pattern--but more pronounced--occurred when the cardio was evaluated across charts in isolation from the other channels (see Table 5). It worked no better than chance on the GK test, but with 8 hits out of 14 decisions, it was highly significant with the POT test.

In view of the weight assigned to this channel by most polygraph examiners, it is important that other examiners reevaluate these charts to determine if this finding was peculiar to the evaluator or if it holds up with other examiners. Of course, the other channels would have to be blocked out in order not to bias the evaluators.

Skin Resistance Response (DC & AC)

There were no significant differences between these two channels. Therefore, they will be discussed together. These two channels were by far the most accurate of the individual channels, with overall hit rates of 64% and 61% for the DC and AC modes, respectively. As with most of the other channels, they were significantly more accurate with the GK test than with the POT, both when evaluated by inspection and when evaluated objectively. The higher accuracy of the objective analysis on the GK test was not surprising, as that analysis looked only at the absolute magnitude of reactions, which would be expected to be the single most important criterion with any test based upon the principle of recognition. It was somewhat unexpected that the examiner's inspection of the SRR channels, which incorporated baseline changes and changes in lability, also produced a higher hit rate with the GK test.

The mm-difference measure deserves some comment, as it has never been reported in previous research. It is based on the concept of relaxation following the tension of the critical item. Examiners have long noted that as the charts are being run and a big reaction to an item is observed, it is not yet certain whether that big reaction represents the critical item. As soon as the reaction to the next item is observed, then the examiner has a very good idea as to whether the previous item has been the critical item or not. If the subsequent reaction is about as big as

Gordon H. Barland, Ph.D.

the previous item, the previous item was probably not the critical item. If, however, the subsequent item elicits only a minimal reaction, that is good evidence that the previous, large reaction represents the critical item.

Note that this mm-difference measure is related to the evaluation of the CQT. It compares two adjacent reactions, and it looks at their relative size rather than absolute magnitude.

A comment is also in order concerning the relative effectiveness of the AC and DC channels. Some examiners have expressed concern that the automatic mode GSR (SRR-AC) may reduce accuracy, particularly with the POT test, since tonic changes (other than in lability) are filtered out, leaving the examiner with less reaction criteria upon which to base a decision. This did not appear to occur here, for the AC and DC channels showed about the same degree of accuracy relative to each other on both POT and GK tests. There were a number of charts in which the AC and DC channels differed as to what number the \underline{S} had selected, but no attempt was made to analyze those special situations to determine which channel seemed to be the better. It often occurred that both channels yielded the same result, but the DC channel was clearer because of the additional data available. This may represent a bias on his part, however, and the channels should be interpreted by other examiners before that impression can be considered valid.

Effect of test type

From all indications in this study--the examiner's on-the-spot decisions, the hit rates for the individual channels evaluated by inspection and objectively scored, and the psychological impact of the test as viewed by the subjects--the GK test seems to be more effective and more accurate than the POT test. Consideration should be given to having the GK test taught in the polygraph schools as a fundamental technique in addition to or in place of the POT test.

The standard psychophysiology texts (e.g. Edelberg, 1972, p. 370) put the lower limit of the SRR latent period as being about 1.2 seconds. In this study the reaction window extended from 1 second after the number was stated to 5 seconds after the subject answered. Despite the fact that the 1 second cutoff used here was below the lower limit published by Edelberg, a number of apparently genuine reactions had latencies of less than 1 second. This occurred not only with the known sequence POT but also with the unknown sequence GK test. Had those premature reactions been counted, it is possible that the hit rate for the SRR channels may have been higher. The charts should be objectively rescored using a latency of 0.5 or even 0 seconds in order to see how the hit rate is affected. If the accuracy is in fact increased, consideration should be given to using the shorter latency in lie detection analyses.

Effectiveness of evaluation methods

There were two major types of evaluations made of the charts: Visual inspection by an examiner (a. On the spot, using all channels on all charts; b. Individual channels on individual charts) and objective analyses of EDA (a. Size of reactions; b. Relative sizes of paired reactions; and C. Lykken scores). The single most accurate method was the on-the-spot visual inspection

by the examiner, which had an overall hit rate of 85% with no inconclusives. This accuracy can not be ascribed to contamination with behavioral cues observed by the examiner, for all subjects in this study were "guilty," and the examiner's task was not to distinguish between "guilty" and "innocent" subjects.

The examiner's decisions were 75% accurate with the POT test and 95% accurate with the GK test. It is not known why the POT test was less accurate. It could be that the recognition principle is a more effective basis than the peak of tension principle, resulting in larger reactions. On the other hand, it is also possible that the presence of multiple, sometimes conflicting reaction criteria decreases the accuracy of the POT test; or it may be a combination of both.

Visual inspection of the individual channels on the charts was much less accurate than when all charts and all channels were available for simultaneous analysis. The accuracy of decisions increased across all channels when only those cases were included where two or more of the three charts agreed with each other; but the inconclusive rate ranged from a moderate 18% when all channels were inspected simultaneously on the isolated charts to a high of 45% and 50% with the plethysmic and respiratory channels. There were several cases where a given channel was internally consistent on all three charts, and yet was wrong. Although the analysis was not done, it is hypothesized that visual inspection of individual channels across charts would have been more accurate had the examiner been able to observe the channel on all three charts simultaneously. When a channel on a given chart had to be looked at in isolation from the other two charts in the sequence, it often occurred that there were two reactions which looked nearly equally likely as representing the critical item. Such situations could likely be easily resolved if the reactions to the same two stimuli could be observed on the other charts. Indeed, it is believed that this is the main reason why the examiner's initial decisions were more accurate.

The Lykken scores were quite accurate (65% overall). It worked well beyond chance levels with both the POT and GK formats, but was more accurate with the GK test (50% and 80% accurate with the POT and GK tests, respectively). That result is consistent with nearly all of the other methods of evaluation (only the cardio and plethysmic channels showed greater accuracy with the POT test). Consideration should be given to teaching this scoring system at the basic polygraph schools because it is accurate far beyond chance levels and can be easily applied by statistically naive polygraph examiners operating in the field. It should be noted, however, that the Lykken scoring system can only be applied when the examiner knows the location of the critical items; it could not be used on a searching POT test. Moreover, the objectively measured mean SRR responses, averaged across the three charts, were more accurate than the Lykken scores, even though the examiner did not know the identity of the critical item! Consideration should also be given to the teaching of objective methods of SRR analysis, particularly with the GK test, in the basic polygraph schools.

Personality variables

The robustness of the polygraph technique is again demonstrated by the fact that the background variables ascertained in the pretest interview (education level, arrest record, ingestion of medication on the day of the exams, previous polygraph examinations, age, sex, and degree of faith in the polygraph's accuracy) had no discernible effect on the accuracy of the examiner's decisions. At the same time, it must be noted that the one subject who participated in Dr. Rovner's countermeasures research several years earlier as also the only subject in this study who "beat" the polygraph on both of the two numbers he had selected. During the debriefing, his protocol was similar to that produced by the other subjects. It is not known which group in Rovner's study he had been in. An N of 1 is too small to allow any conclusions about any possible connection, but it does suggest a possibility that should be explored in future research.

Perhaps the most controversial personality variable that may affect the accuracy of the polygraph is psychopathy and/or socialization. Waid, Orne & Wilson (1979) found that CPI scores on the socialization (So) scale were positively correlated with both detection and false positive errors. None of the Pearson product moment correlations between So scores and the three Lykken scores was significant, nor was the binomial test on the number of errors produced by the high- versus low-So scorers significant. Thus, this study does not support the finding of Waid *et al.* but it does support the position that the polygraph is a robust technique not readily affected by personality variables.

There are about 13 theories of detection of deception, of which the one most widely cited by field examiners is that the responses to deception are caused by the fear of detection or the fear of punishment or the fear of consequences. In this study the situation was so arranged that such sources of fear should be minimal. This was verified by the debriefings of the subjects. Nonetheless, the accuracy of the polygraph technique in this non-fearful situation was far beyond chance levels. Obviously, if the reactions are caused by fear in certain situations, fear is not necessary for highly accurate results, at least in this type of situation. This raises the question of whether fear is a necessary factor when criminal suspects are being examined with the CQ technique.

FACTORS AFFECTING GENERALIZATION OF THE RESULTS

There are several factors which may have made the polygraph more accurate in this situation than it may be in many field uses. One is the examiner's certainty that each subject's chart contained one and precisely one lie. It is interesting to speculate about how accurate the examiner's decisions in this study would have been if "innocent" subjects, who had selected a blank card containing no number, had been included. There were a number of cases in which the subject's number was correctly detected, based primarily upon a significant reaction in one chart alone. Had innocent subjects been included, the examiner may well have required a greater degree of consistency before concluding that the subject had selected a specific number, and the error rate would likely have been greater. This, the accuracy rates reported here may be higher

than most real life situations in which the examiner is less than certain that the subject must be lying to one of the items.

Another factor affecting the generalizability of these results is what Backster has called distinctness of issue. In this study the subjects knew precisely which item was the one critical one. In some real life situations a POT test may be rather ambiguous. For example, if an employee is believed to have stolen money from an employer over the course of time, he may be administered a searching POT test to determine how much was stolen. If, however, the employee does not know precisely how much he took, he may respond to several items in the test, and his pattern of responses is more diffuse. That would be expected to increase the error rate in detecting guilt, and increase the error rate in pinpointing the most correct item within the guilty group.

Finally, the subjects in this study knew that they were not suspected of anything serious. However interesting they found the procedure, and whatever their motivation in volunteering to participate in the research, they tended to view the examination somewhat as a game or a challenge. The extent to which their reactions were quantitatively or qualitatively similar to subjects being examined in real life situations is largely known.

The relative effectiveness of the various physiological channels found in this study needs to be integrated with results from other researchers, especially those trained at schools other than the federal polygraph school. For example, some schools teach that respiration and the cardio are extremely effective, whereas this study could not support that assertion. It could be that graduates of such polygraph schools may have been taught other, more valid criteria for interpreting respiration than were used in this study. It would be useful to have the polygraph charts from this study interpreted blindly by experienced examiners from those schools.

CONCLUSIONS AND SUGGESTIONS

The unknown sequence GK test was far superior to the known sequence POT test in this study. If this finding is replicated by other research, the GK test should be taught at polygraph schools in addition to the POT test, and should become the technique of preference in many situations where either test could be used. More research is needed to establish the strengths and weaknesses of the two test formats relative to each other. Objective techniques of scoring the SRR channel should also be taught at the polygraph schools. These techniques should include objective measurement of the height of the SRR reactions (use of scoring windows to differentiate between scorable and nonscorable reactions, measurement of multiple reactions, determining the mean height across charts), and use of the Lykken scoring system.

Biofeedback, as used in this study, was not effective in increasing the accuracy of chart interpretations. Indeed, this study suggests that the use of biofeedback may have slightly degraded the polygraph's accuracy. Additional research is needed to resolve the question of why

this study failed to replicate the work of Stern and his colleagues, which showed very favorable results for biofeedback.

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Polygraph, 26 (1) (1997).

COLLABORATIVE POLYGRAPHY: A THERAPEUTIC MODEL

By

Richard N. Mack and Michael C. Gougler

Abstract

Effective treatment of sex abusers relies, in large part, on the abuser's ability to stop a tendency to deceive, lie, and manipulate. Techniques which assist the abuser in the accomplishment of this task are valuable. In addition, it is vital for the treatment professional to have an accurate picture of the internal processes of the abuser in order to facilitate the abuser's healthy progression. Polygraphy has proven to be an invaluable tool in both these regards. Collaborative polygraphy is a model in which polygraph examination techniques are integrated with the therapeutic process to produce positive clinical therapeutic effects for the abuser.

The following model of collaborative clinical polygraph examination of sex abusers has been developed over the past five years as a result of interaction between the Gougler Company and Marriage and the Family Therapy Associates. The model involves intense interaction between the polygraph examiner and therapist on several different levels:

Pre-Polygraph Examination Preparation: The abuser is prepared for the process, beginning approximately four to six weeks prior to the actual clinical polygraph examination, with emphasis on increasing a level of anxiety regarding truth telling. This anxiety helps to produce prepolygraph examination admissions of relevant material and helps to insure reactive responses to relevant questions to which deceptive answers may be given. In this part of the process the actual collaborative polygraph model is described fully, emphasizing that the clinical polygraph examination is able to see through most of the psychological defenses which the abuser has developed in order to avoid the guilt and shame associated with deviated activity; that this is an intense process; that the experience of those who have gone before has been both positive and negative, and that communicating to the supervising officer that truthful results have been produced by this relatively objective measure is vitally important for the abuser.

Offense Report: In order for a clinical polygraph examination to have the highest possible validity it is important that the polygraph examiner, as well as the therapist, have access to copies

Mr. Mack is a therapist, Director of Marriage & Family Therapy Associates. Mr. Gougler is a member of the APA and is owner of The Gougler Company. For reprints write to Richard N. Mack, Marriage & Family Therapy Associates, 3809 -- 22nd Street, Lubbock, Texas 79410.

of the original offense report(s). Access to offense reports enables the polygraph examiner to have some modicum of objective reality to test against. This is important when the abuser is in denial of the instant offense at the time of the initial clinical polygraph examination. Some Community Supervision and Correction Departments suggest that it is not possible to give offense reports to therapists. This procedure has been researched in Lubbock County, Texas, where it was determined that offense reports with the names of victims removed could be transmitted to therapists. Some Community Supervision and Correction Departments suggest that they will transmit summaries of the offense report. Summaries are not satisfactory for a valid clinical polygraph as they afford the abuser who is deceptive on a disclosure polygraph examination, and who remains in denial, a line of defense in support of continued denial.

Focus Questions: The individual therapist, in collaboration with all other systemic colleagues, including group therapist, probation/parole officer, polygraph examiner, family members, victims, and others, develops questions about concerns that have surfaced over the course of therapy since intake, or the most recent polygraph examination. These questions focus on the areas of disclosure for those abusers still in denial of the instant offense, sexual history for those abusers who have not been able to provide full information about the breadth, width, and depth of their involvement in sexual deviance, and/or monitoring for those abusers for whom the primary area of concern is their behavior since their most recent polygraph examination. In the interest of increased validity only one area of questions may be posed at each polygraph examination.

Pre-Interview Collaboration: The individual therapist and the polygraph examiner spend time in face-to-face meeting sharpening areas of concern to be explored during the polygraph examination process. This meeting includes study of the focus questions, the offense report, any previous polygraph examination results, and immediate concerns of the therapist regarding the therapeutic issues of the abuser being examined. These immediate concerns may relate to the abuser's sexual issues, attitude in therapy (thus, the attitude expected by the polygraph examiner during the polygraph examination), and conditions that might affect the examination outcome such as intellectual capacity, physical condition, immediate psycho-social stressors, severe psychopathology, etc. A strategy for effectively approaching the abuser during the pre-test interview is discussed and developed using the above information.

Pre-Test Interview: This initial contact between the polygraph examiner and the abuser is focused on the areas of concern noted above. Taking as long as necessary, this interview centers on gaining voluntary admissions in areas of clinical concern. This interview often involves the individual therapist, who has additional insight into the defenses of the abuser. Approaches toward the abuser during this interview being with those discussed in the Pre-interview Collaboration noted above, but are not limited to them. If the discussed approaches appear to be unfruitful, either the polygraph examiner or the therapist may call a recess in the interview in order to collaborate further in the attempt to develop a more productive alternative.

Clinical Polygraph Examination: This is the actual generation of polygrams from the abuser, using questions that have been generated in the course of the above noted process. This procedure involves only the polygraph examiner and the abuser. Several different question

formats are available to the examiner, depending on the facts of the offense and the examination results that are desired:*

The modified general question test (MGQT) allows for the maximum number of relevant questions, in order to explore more areas of inquiry. The test contains a mixture of relevant questions (designed to cause a specific response if the subject is emotionally concerned about one of them), irrelevant questions (planned to establish a normal tracing standard on the test chart and to give the subject relief after pertinent questions), and control questions (designed to evaluate whether a subject is suitable for polygraph examination and whether it is possible for the subject to produce a specific physical response). These questions are asked in a planned order.

The zone comparison test (ZCT) is structured in format to allow for the comparison of various zones of specific responses with control response zones for the more easy interpretation of specific responses.

A zone test format is used when there is only one question to be addressed on the polygraph examination.

A general question test (GQT) format utilizing disguised control questions is used when the subject is familiar with polygraph techniques or has refused to discuss standard control question areas.

The peak of tension test is constructed to cause the subject's tension to peak at one particular question. All questions on this test are irrelevant but one. The subject is aware of the order of questioning. This format is used only when unpublicized information is available to the therapist, polygraph examiner and possibly to the subject. A subject who reacts to this format will have responses that peak at the relevant question and decline thereafter. A subject not reactive to the relevant question will produce flat tracings.

All of the above are designed to produce responses on the part of the abuser that will assist in the development of appropriate clinical material germane to the abuser's treatment.

Post-Test Collaboration: The polygraph examiner shares the results of the polygraph examination with the therapist. Areas of therapeutic clinical concern and areas for further inquiry are noted. Any legal ramifications to admissions or deception are discussed.

Post-Test Interview: The polygraph examiner, sometimes in conjunction with the therapist, shares the results of the polygraph examination with the abuser. In the case of the generation of polygrams interpreted to be deceptive, the polygraph examiner will attempt to resolve the issues of concern with the abuser.

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^{*} Note: The description of the test formats are those of Mr. Gougler. [Ed.]

Post-Polygraph Examination Individual Therapy Session: The individual therapist meets with the abuser to discuss the entire polygraph experience, the polygraph examination results, and any issues that have emerged, including both admissions and deceptions, if any. This provides the therapist with the opportunity to anchor any admissions that have been made by the abuser in the course of this process. It is our experience that certain abusers will recant, minimize, or omit admissions that have been made to the polygraph examiner if too much time is permitted between the polygraph examination and therapeutic follow-up.

Deception Resolution: Should the abuser have a polygraph examination result indicating the presence of deception, the individual therapist, during the post-polygraph examination individual therapy session, informs the abuser that he or she has 90 days in which to resolve these deceptions. The abuser is told that another clinical polygraph examination will be administered at that time to assure that this resolution has taken place. Should such resolution not occur a letter will be written to the abuser's supervising officer to the effect that the deceptions have not been resolved and that the abuser is expected to explain this discrepancy to the Judge.

Several idiosyncrasies of the collaborative clinical polygraph deserve further comment: It is important that the entire process detailed above take place on the same day, in as compressed a period of time as possible. A major issue for sex abusers is that of being responsible and accountable for behavior; a major problem has been the inability of the abuser to be either. There is a tendency for a significant portion of the sex abuser population to disavow admissions that have been made for the purpose of passing the polygraph examination. This is counterproductive to the overall treatment process. Completing the entire process on one day minimizes that tendency and permits the team to assist the abuser in anchoring progress made during the course of the examination.

While the entire thrust of this process is the development of clinical material for the achievement of therapeutic goals there are occasions where legal issues emerge from the clinical polygraph examination. This is the case when additional episodes of sexual abuse, other than those noted in the offense report, come to light. Some of these episodes are historic, that is they have occurred prior to the instant offense. Some of these episodes are current, meaning that they have occurred after the entry of the abuser into treatment or subsequent to the most recent clinical polygraph administration. In accordance with Texas law, information concerning these additional episodes must be communicated to proper authorities. It is the policy of Marriage & Family Therapy Associates to encourage the abuser to share this information with the Probation or Parole Office, or Protective Service Worker. Follow-up conversations are held with those professionals to assure that the appropriate information has been shared. The Gougler Company shares this information directly with the abuser's supervising officer by means of a final written report of the polygraph examination results, including the results of the pre- and post-polygraph examination interviews.

A key to the success of the model is the ability of the interview team to synchronize their work. This working relationship enables the polygraph examiner and therapist to complement

Collaborative Polygraphy

one another's styles in order to elicit material from the abuser that has the greatest therapeutic productivity. The relationship between polygraph examiner and therapist must be consistently and continually processed to assure that these two professionals are not working at cross purposes, but rather are appropriately focused on maximizing the potential of the polygraph experience to effect the healthy progression of the abuser.

It is important that results of the clinical polygraph examination be shared throughout the larger system. The examination results provide a significant indicator for all persons involved in the treatment of the abuser including professionals, family members, and therapy group members alike, and of the progress of the abuser in the treatment process. This collaboration enables abusers to gain a real sense of their health or continued pathology.

* * * * * *

LEGAL NOTE: WARRANTS AND POLYGRAPH EXAMINATIONS

Bv

Donald A. Weinstein

In most cases forensic psychophysiologists are asked to determine through the use of a polygraph technique whether a person is being truthful or deceptive about denial in some criminal act, or if that person meets established criteria expected of a loyal employee. But there is more to the use of the polygraph than these day-to-day services. One unusual use of the polygraph is to obtain and arrest and, perhaps, search warrants.

In 1974, a California appellate court considered the use of polygraph results in obtaining an arrest warrant, but their view was ambiguous. In *People v. Lara*, 117 Cal.Rptr. 549, 528 P.2d 365 (1974), a police officer testified that a polygraph examination of a material witness substantiated the witness' credibility in regard to probable cause. The appellate court said, "Whatever may be the rule on the admissibility of the results of a polygraph test as evidence of guilt ... we are cited no authority holding such collateral use of the test for investigative purpose to be improper." However, the appellate court noted that the trial court apparently did not place reliance on the polygraph evidence as the sole factor in finding probable cause.

In 1976, a more direct declaration was obtained. In *Herlong v. State*, 223 S.E.2d 672 (Ga. 1976), the Georgia Supreme Court held that it was not reversible error to admit into evidence the fact that a prosecution witness had taken a polygraph test after which the investigating officers obtained warrants for the arrest of the defendants. The court said it was necessary to explain the conduct of the police.

In 1989, a federal decision on the use of polygraph results in support of a warrant came about in a suit in a federal district court. Earlene Bennett and her husband, Mark Bennett, were arrested by the cities of Grand Prairie, Texas and Mesquite, Texas for theft. After they were arrested, a grand jury failed to indict, and they sued. The cases were joined as *Bennett v. City* of Grand Prairie, Texas, 883 F.2d 400 (5th Cir. 1989). Ms. Bennett was developed as a suspect concerning the theft of a large sum of money from her place of employment, a check cashing enterprise. She was subsequently offered a polygraph, and the report indicated she answered truthfully when denying having entered the place of business after hours for a "dishonest reason."

The author is Vice President-Government of the American Polygraph Association, and Chief of the Federal Certification Program, Department of Defense Polygraph Institute, Building 3195, Fort McClellan, Alabama 36205-5114. The author appreciates the assistance of Captain Stephen H. Miller, USA, Chief of the Military Justice Branch, Office of the Staff Judge Advocate, Fort McClellan, Alabama. The opinions expressed in this article are those of the author and do not represent an official opinion of the United States Government.

But she answered deceptively when she denied knowing who stole any of the money, and whether or not she had helped steal any money from the business, a so-called "split" call. The court noted that the arrest warrant for Ms. Bennett was based in part on the results of her polygraph examination, plus additional facts, which, when considered in their totality, supported the contention that Ms. Bennett was a logical suspect in this theft.

In her suit, Ms. Bennett claimed the warrant was obtained without probable cause, a violation of her civil rights. In support, she referred to an "inconclusive" result, because of contradictory results, referring to the "split" call. The district court ruled that Ms. Bennett's polygraph examination result was not inconclusive, citing the examiner's report that she answered critical questions deceptively. This, said the court, served to corroborate the additional facts that focused attention on Ms. Bennett as a suspect. The United States Court of Appeals, Fifth Circuit, held that probable cause existed for the arrest of Ms. Bennett, and even if it did not exist for Mr. Bennett's arrest, the city was immune from liability. The dismissal by the district court was affirmed.

The court acknowledged the fact that in some decisions, polygraph evidence is inadmissible at trial, per se, and there is a valid rationale that supports that exclusion. Where excluded, decisions have cited a fear that juries would overestimate the probative value when deciding guilt or innocence. However, *Bennett* points out that "unlike a lay jury, a magistrate possesses legal expertise when determining probable cause and is unlikely to be intimidated by claims of scientific authority into assigning inappropriate evidentiary value to a polygraph report or to rely excessively on it." The decision adds that probable cause may be founded on hearsay or upon information from informants, evidence that might very well be excluded at trial if the information reported is believable or appropriately accepted as true by the person seeking the warrant. In summary, the federal appellate court refused to bar issuance of a warrant when polygraph test results are offered with other facts. It is the author's opinion that a court, in most jurisdictions, would not accept a finding of probable cause based solely on a polygraph test result. Although we find only three cases on this topic, apparently polygraph test results may be useful in conjunction with other evidence to support a finding of probable cause. A reasonable extension of this view is that a polygraph test of an informant and its results could be used to develop or find other evidence used in establishing probable cause without involving the poisonous tree doctrine. A word of caution: Informants seldom tell the complete truth, and any deception during the examination must be reported and considered by the warrant issuing authority.

Note: For information on the validity of testing informants, see, Blum, Richard H. & Osterloh, William (1968). The polygraph examination as a means for detecting truth and falsehood in stories presented by police informants. *Journal of Criminal Law, Criminology and Police Science*, <u>59</u>, 133-137.

RELEVANT-IRRELEVANT SCREENING TEST SUPPORTED IN COLORADO COURT CASE

In the following case the District Court, Count of El Paso, State of Colorado, ruled, inter alia, that the use of the Relevant-Irrelevant polygraph test by the Colorado Springs Police Department was not arbitrary or irrational. [Ed.]

Law v. City of Colorado Springs, et al. (1996)

District Court, County of El Paso, State of Colorado Case No. 92CV0986, Division 2

FINDING OF FACT, CONCLUSIONS OF LAW, AND JUDGMENT

THE COURT, having heard testimony in the trial of this matter and having considered oral and written argument of counsel, submits its Findings of Fact, Conclusions of Law, and Judgment.

NATURE OF THE CASE

Plaintiff applied for a police officer position with the Colorado Springs Police Department in 1989, 1990, and 1991.¹ In 1989, Plaintiff did not score highly enough on the initial portion of the test to warrant further consideration. In 1990 and 1991, however, Plaintiff scored highly enough on the initial testing to be one of the 74 applicants placed in what is known as "Band II." (After the initial testing eliminated some applicants, the remaining applicants were placed in three groups called "bands" for further consideration in the application process.) As a result of placing in Band II, Plaintiff continued through additional steps in the 1990 and 1991 application process. Under Colorado Springs Civil Service Rule 3.3, a background investigation, including a polygraph test, was required.

The polygraph examination was administered in both 1990 and 1991 by Defendant Jeannie Overall. In administering the polygraph test, Defendant Overall used a questioning technique known in the polygraph industry as the Relevant-Irrelevant ("R-I") technique. At the conclusion of the 1990 polygraph examination, Defendant Overall concluded that Plaintiff was deceptive in four areas: (1) theft from employers, (2) criminal activity, (3) marijuana usage, and (4) illegal drug usage.

Full title: David Law, Plaintiff, v. City of Colorado Springs, Lorne Kramer, in his official capacity as Chief of Police, the City of Colorado Springs Civil Service Commission, and Jeannie Overall, Defendants.

¹ The Court permitted only limited evidence regarding the 1991 application and testing process.

Polygraph, 26 (1) (1997).

Relevant-Irrelevant Screening Test Supported in Colorado Court Case

Plaintiff's application, background investigation, polygraph test results, and other materials were considered each year by the Chief of the Police Department (James Munger for the 1990 applications), with the advice of three deputy chiefs and staff assistance provided by the Police Personnel Services Manager. In each of these years, the chief decided not to make an offer of employment to Plaintiff or, in the terms of Civil Service Rule 3.3, decided that Plaintiff was "disqualified."

Plaintiff's original complaint in this case was filed on March 19, 1992. Certain claims were added and deleted, but, as of the time of trial, the following claims remained before the Court:

- (1) SECOND CLAIM violation of United States constitutional substantive due process rights.
- (2) THIRD CLAIM violation of United States constitutional right of equal protection under the law.
- (3) FIFTH CLAIM violation of Colorado constitutional right to due process of law.
- (4) SIXTH CLAIM denial of Colorado constitutional right to equal protection under the law.
- (5) NINTH CLAIM willful and wanton misconduct against Defendant Overall, individually.
- (6) TENTH CLAIM intentional interference with an economic relationship against Defendant Overall, individually.
- (7) TWELFTH CLAIM failure to maintain objective hiring standards in violation of right to due process.

Plaintiff limited his claims to the 1990 polygraph examination and its use in the police officer selection process. Plaintiff does not challenge the right of the police department to use the polygraph examination to get admissions. Plaintiff also does not challenge the police department's right to rely upon opinions of deception by polygraph examiners who use the control question ("CQ") technique, a technique Plaintiff concedes is a scientifically valid polygraph technique. Plaintiff does challenge the police department's right to use the R-I technique employed by Jeannie Overall, arguing that it is not scientifically valid and that it is arbitrary and irrational for Defendants to use and rely on such test results to disqualify Plaintiff from employment as a police officer.

FINDINGS OF FACT AND CONCLUSIONS OF LAW

THE COURT FINDS THAT THE POLYGRAPH EXAMINATION WAS A SUBSTANTIAL FACTOR IN CAUSING PLAINTIFF NOT TO BE HIRED AS A POLICE OFFICER WITH THE COLORADO SPRINGS POLICE DEPARTMENT.

The court is sympathetic to the problem that Mr. Munger had in reconstructing, some six years after the fact, the specific reasons for disqualifying Plaintiff as an applicant for a position with the Colorado Springs Police Department. Plaintiff was just one applicant out of many. There does not appear to have been any particular reason, at the time, to focus on Plaintiff's application.

Police officers are often called upon to articulate the basis for decisions they make. In search and seizure cases, for instance, police officers are required to come to court and articulate for the court the reasons why the officer undertook certain acts. It is not enough for the officer to say that he/she undertook the act "based on my experience." The officer has to spell out what that basis was for his/her decision.

In the Court's opinion, Mr. Munger was unable to provide sufficient explanation, other than the results of the polygraph, as to why Plaintiff was disqualified as an applicant. To the extent that Mr. Munger attempted such alternate explanation, the Courts does not find it persuasive. Therefore, the Court finds that the results of the polygraph test administered during the 1990 application process caused Plaintiff to be denied an offer of employment as a city police officer. The Court further finds that if an offer of employment had been made to Plaintiff, he would have accepted it and become a Colorado Springs police officer.

THE FINDS THAT THE COLORADO SPRINGS POLICE DEPARTMENT HAS A LEGITIMATE INTEREST IN OBTAINING INFORMATION ON PROSPECTIVE POLICE EMPLOYEES.

Law enforcement officers are empowered to do certain acts which can have far-reaching consequences. They are uniquely empowered, even for only a short period of time, to deprive persons of the right of freedom. They are empowered to investigate and accuse persons of criminal activity. the weight of their authority on the street leaves little room for challenge. They have the power, within certain confines, to take physical liberties with individuals. In short, law enforcement officers have an authority which no one else, public or private, has. It is important that governmental authorities be given wide latitude in their attempts to screen from this employment potentially unsuitable candidates. As set forth in *McCain v. Sheridan*, 324 P.2d 923 (Cal. 1958):

... A member of the police force must be above suspicion of violation of the very laws he has been sworn and empowered to enforce. ... [Policemen] can perform their duties only if they merit the truth and confidence of the mass of law-abiding citizens. Whatever weakens that trust tends to destroy our system of law enforcement.

324 P.2d at 926.

The Court finds that the Colorado Springs Police Department has a legitimate interest in obtaining information regarding prospective police officers, to include information as to prior criminal conduct and information as to the trustworthiness of the candidate.

THE COURT FINDS THAT IT IS NOT PRECLUDED BY *PEOPLE V. ANDERSON*, 637 P.2d 354 (Colo. 1981), FROM CONSIDERING EVIDENCE OF POLYGRAPH AND POLYGRAPH TESTING.

Plaintiff argues that the Colorado Supreme Court in *People v. Anderson*, 637 P.2d 354 (Colo. 1981), has articulated a per se exclusion of evidence of polygraphs in criminal cases and that cases subsequent to *People v. Anderson* have applied that rule to civil cases. The Court disagrees. The Court does not read the per se rule of inadmissibility of polygraph results in criminal cases to be so inclusive as to prevent the use of polygraphs by police departments in the pre-screening of police officer candidates, nor does the Court read that decision to preclude testimony regarding polygraph tests and the results of such testing as it relates to the use of polygraphs in the context presented here. The Court observes that there are respected courts in the United States, generally, using a slightly different test than in Colorado that have found that evidence of polygraph examinations should not, per se, be excluded from criminal trials but should be considered on a case-by-case basis.

THE COURT FINDS THAT PLAINTIFF DOES NOT HAVE A PROPERTY INTEREST IN PROSPECTIVE EMPLOYMENT.

In order to assert a substantive due process claim under either the Colorado or United States Constitution, Plaintiff must establish that he has a property interest recognized by the Fourteenth Amendment. State v. DeFoor, 824 P.2d 783 (Colo. 1992); Faber v. State, 143 Colo. 240, 353 P.2d 609 (1960); Holland v. Board of County Commissioners, 883 P.2d 500 (Colo.App. 1994); Archuleta v. Colorado Department of Institutions, 936 F.2d 483, 491 (10th Cir. 1991); Phelps v. Wichita Eagle-Beacon, 886 F.2d 1262 (10th Cir. 1989).

In Wilkerson v. State, 830 P.2d 1121 (Colo.App. 1992), the court, citing Board of Regents v. Roth, 408 U.S. 564, 92 S.Ct. 2701, 33 L.Ed.2d 548 (1972), set forth the following criteria of when a person has a property interest for due process purposes:

To have a property interest in a benefit, a person must have more than an abstract need or desire for it and must have more than a unilateral expectation of it. Instead, he must have a legitimate claim of entitlement to it.

The case where the facts are most analogous to this matter is Anderson v. City of *Philadelphia*, 845 F.2d 1216 (3rd Cir. 1989). In Anderson, the plaintiffs applied for employment with the City of Philadelphia police department. As a part of the employment screening process, the plaintiffs were required to take a polygraph examination.² Based upon the results of the polygraph examinations, the plaintiffs were denied employment. The plaintiffs argued that they had a property interest in employment as defined by *Board of Regents v. Roth, supra*. The district court held for the plaintiffs after a trial.

On appeal, the court of appeals reversed and held that the plaintiffs were "never more than applicants for employment." The court further stated that "[a]lthough the plaintiffs occupied high positions on the civil service eligibility lists for the type of employment they sought, occupancy of these positions entitled the plaintiffs to nothing more than consideration for employment when openings occurred." The court held that the plaintiffs' interest in the civil service positions they sought did not rise to the level of a property interest protected by the Constitution. 845 F.2d at 1220, 1221.

Here, as in Anderson v. City of Philadelphia, supra, Plaintiff was merely an applicant for employment with the City of Colorado Springs Police Department. Plaintiff had no legitimate claim to employment with the City of Colorado Springs and therefore no property interest.

Plaintiff, in support of his argument, cites *Department of Health v. Donahue*, 690 P.2d 243 (Colo. 1984). This case does not support Plaintiff's argument. There, the Colorado Supreme Court held that "[a] probationary employee lacks a legally protected interest in continued employment sufficient to create an entitlement to a due process hearing prior to discharge," except for violation of certain constitutional rights which were not addressed in that case. 690 P.2d at 249.

Plaintiff argues that Montova v. City of Colorado Springs, 770 P.2d 1358 (Colo.App. 1989), supports his claim that he has a property interest in his prospective employment as a police officer. Montova involved a lieutenant in the fire department whom the defendants conceded had a property interest in continued employment. 770 P.2d at 1363. The plaintiff relied on the promotional policies for existing employees to claim merely that he had a contract which required the city to "consider" him for promotion in accordance with expressed policies. *Id.* Relying on the right of an existing civil service employee to contest the results of a personnel action if it was claimed to be in violation of city ordinances or policies, the court of appeals held that such "regulations may be looked upon as constituting an implied contract between the employee and the municipality" which could constitute a property interest. *Id.*

² Anderson does not set forth the type of polygraph testing technique being employed by the City of Philadelphia.

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Montova is distinguishable because it only involves the right of an employee with a continued interest in his employment to be considered for a promotion under specific civil service provisions. That case does not recognize any property right for new applicants to have a legitimate entitlement to a position, which is the claim of Plaintiff in this case.

THE COURT FINDS THAT EVEN IF PLAINTIFF WERE TO HAVE A PROPERTY INTEREST IN PROSPECTIVE EMPLOYMENT, THE COLORADO SPRINGS POLICE DEPARTMENT'S USE OF THE R-I POLYGRAPH TECHNIQUE IS NOT ARBITRARY OR IRRATIONAL.

The parties presented expert testimony from nationally known experts. Each expert had considerable experience in their fields. Defendants' experts were Dr. William Yankee and Mr. Norman Ansley. Dr. Yankee was the former director of the Department of Defense Polygraph Institute, a school that instructs federal polygraphers on the subject. Mr. Ansley has been involved for a number of years with polygraphy through the National Security Agency and is actively involved in the publication of *Polygraph*, the journal for the American Polygraph Association. Plaintiff's experts were Dr. David Raskin and Dr. Charles Honts. Both Dr. Raskin and Dr. Honts have extensive academic and research background in polygraphy. Through these experts, the parties presented considerable evidence of studies, surveys, and publications regarding utility, validity, and accuracy of polygraph testing and specifically R-I polygraph testing. Some of the studies had research flaws. Others were old. Many, however, were written more recently and dealt with topics relevant to the issues here. Defendants' experts testified as to advantages that the R-I technique had over the CQ in screening applicants. Plaintiff's experts disagreed.

This Court, as the finder of fact, finds a certain amount of condescension on the part of Plaintiff's experts that, because they were academics and they were researchers, their evaluations were entitled to more weight than Defendants' experts, who were more practitioners and less researchers. Notwithstanding Plaintiff's argument that much of the research articles relied on by Defendants' experts in support of the R-I testing technique were not published in peer review journals, Dr. Honts conceded in his testimony that some of the articles relied on by Defendants' experts were published in peer review journals and that Dr. Honts believed that the three studies conducted by Dr. Yankee which supported the use of the R-I in screening were well done, with appropriate methodology, and were authoritative in their evaluation.

The Court also finds significance in the fact that the United States Congress, in promulgating legislation restricting the use of polygraphs in employment screening by most private entities, felt it appropriate to allow governmental agencies to continue to use polygraphs in screening employees. If Congress wished to prevent governmental agencies' use of the R-I polygraph testing technique for screening of governmental employees, it could have prevented the use of that particular technique and allowed the generalized use of the CQ technique or some other polygraph testing technique. The Court also observes that a number of federal, state, and local governmental agencies, to include police departments, are utilizing the R-I technique for screening employees. This Court, as a finder of fact, cannot find that all of these agencies are just academic dinosaurs that are not up-to-date with the state of polygraph research. These agencies have a natural desire on their part to keep their particular departments as sufficient and effective as they can be.

The Court finds that, at least as of 1990, there was legitimate debate among persons in the field as to the utility, accuracy, and validity of the R-I testing technique and that literature and studies in this area were in disagreement as to the extent of the utility, accuracy, and validity of the R-I.

The Court also finds that there is evidence of utility of the R-I testing technique. Even Plaintiff's experts concede that one effect of a polygraph examination program is the obtaining of admissions, and Plaintiff does not challenge that particular use of the examination. Indeed, Colorado courts have accepted as admissible admissions obtained through polygraph examinations. However, obtaining admissions through a polygraph examination does not necessarily depend on the type of testing technique used. As to accuracy and validity, the Court finds, and the experts generally agreed, that the R-I technique is considered a good testing procedure for identifying deceptive individuals. Plaintiff's experts testified, however, that there was a large percentage of non-deceptive individuals identified as deceptive in using the R-I technique. (These errors are referred to as false positives.) Defendants' experts disputed Plaintiff's expert testimony as to the rate of false positives.

The Court finds that, from the perspective of the Colorado Springs Police Department, the police department has a legitimate government interest in separating those applicants who are deceptive in their response to those areas made a subject of the department's polygraph examination from non-deceptive applicants. Although the polygraph test does not set forth the degree of deception, it does provide information as to the trustworthiness of the candidate. As set forth above, the Court finds that being trustworthy is a legitimate consideration in selecting police officers. The Court acknowledges that it is unfortunate that some truthful individuals may be identified as untruthful. However, the Court finds that it is not unreasonable for the Colorado Springs Police Department to conclude and believe that the use of the polygraph, and specifically the R-I polygraph technique employed by Jeannie Overall, results in identifying a pool of candidates who are better suited for employment as a police officer than they would get without it.

The Court finds that Plaintiff has failed to carry his burden of proof on this issue. The Court further finds that the Colorado Springs Police Department's use of the R-I technique was not arbitrary or irrational or otherwise in violation of any arguable substantive due process right of Plaintiff.

THE COURT FINDS THAT DEFENDANTS DID NOT FAIL TO MAINTAIN OBJECTIVE HIRING STANDARDS IN VIOLATION OF PLAINTIFF'S RIGHT TO DUE PROCESS.

As set forth above, the Court has found that, as an applicant for a position as a police officer with the Colorado Springs Police Department, Plaintiff did not have a constitutional property right in prospective employment with the department. Additionally, the Court finds that Plaintiff has failed to establish that Defendants failed to maintain objective hiring standards in violation of Plaintiff's right to due process and/or otherwise have unconstitutionally delegated legislative power.

THE COURT FINDS THAT THE COLORADO SPRINGS POLICE DEPARTMENT'S USE OF THE R-I POLYGRAPH TECHNIQUE DID NOT VIOLATE PLAINTIFF'S RIGHT TO EQUAL PROTECTION.

The "threshold question in any equal protection challenge is whether the legislation results in dissimilar treatment of similarly situated individuals." *Duran v. Industrial Claim Appeals Office of State of Colorado*, 883 P.2d 477 (Colo. 1994). Plaintiff has not met this threshold requirement because he has not demonstrated dissimilar treatment by similarly situated individuals.

Alternatively, even if Plaintiff had met the threshold requirement discussed above, Plaintiff did not show that there is no rational basis for Defendants' use of the R-I polygraph examination to assist in evaluating applications for the position of police officer. Where a hiring scheme adopts a classification that neither burdens a suspect class nor impinges on a fundamental right, the classification will withstand an equal protection challenge if it is rationally related to a legitimate state purpose. For the reasons previously stated, the Court finds that there was a rational basis for Defendants' use of the R-I.

THE COURT FINDS THAT JEANNIE OVERALL IS IMMUNE FROM MAINTENANCE OF THE CLAIMS AGAINST HER.

Jeannie Overall, as an employee of the Colorado Springs Police Department, is a public employee protected by the provisions of the Colorado Governmental Immunity Act, C.R.S. Sec. 24-10-106 (CGIA). The CGIA has not created an exception for the tort claims made by Plaintiff against Ms. Overall. The Court adopts its findings as set forth above and finds that, as a matter of fact and law, the conduct of Ms. Overall was not willful and wanton. As previously observed by the Court, evidence at trial demonstrated that the R-I polygraph technique is a widely-used screening technique by many federal agencies and by many police departments. Further, although there is controversy in the research and literature, there is, as set forth above, research and literature in the field supporting the utility, validity, and accuracy of R-I polygraph testing. As such, the Court finds that Ms. Overall is entitled to both qualified and good faith immunity.

THE COURT FINDS THAT PLAINTIFF'S CLAIMS ARE BARRED, AS HE SIGNED A RELEASE BEFORE AND AFTER HIS POLYGRAPH EXAMINATION, BARRING ALL CLAIMS AGAINST DEFENDANTS.

The Court finds that Plaintiff did sign a release both before and after each polygraph examination. The release agreement provides in pertinent part:

I do hereby specifically waive any and all rights of privacy that I have or may ever have with reference to the taking of said examination and the making known the results and opinions arising from said examination. I do hereby authorize the Colorado Springs Police Department, its officers and employees to disclose both orally and in writing the said results and opinions to any and all interested persons including employees and/or representatives of the above for whatever use they may determine.

... I do hereby release and covenant to forever hold free from all harm, liability or damage to me as a result of the examination and opinions the Colorado Springs Police Department, together with its officers and employees and the above named who may use the results and opinions of this examination. I remise, release, waive and forever discharge the Colorado Springs Police Department from any and all action or cause of action, claim or demand, liability or legal actions which I have now or may ever have resulting directly or indirectly or remotely both from my taking said examination and the oral and written opinions rendered because of said examination.

[Emphasis added.] Plaintiff testified during trial that he did sign the release and did not feel that he misunderstood anything about the meaning of the release.

Plaintiff voluntarily applied for employment and signed a release both pre- and postexamination, stating that he understood the release and its terms. The Court finds, after considering the factors as set form in *Heil Valley Ranch*, *Inc. v. Simkin*, 784 P.2d 781 (Colo. 1989), that the release was valid. As such, the release bars all of Plaintiff's claims against Defendants.

JUDGMENT

For the reasons set forth above, the Court enters judgment in favor of Defendants.

DONE THIS 14th day of November, 1996.

BY THE COURT:

Richard Hall District Judge

EMPLOYMENT INFORMATION RELEASE AGREEMENTS

By

Daniel L. Schofield, S.J.D.

Law enforcement organizations need to hire employees who possess the highest degree of integrity, character, and professional competence. The public expects this to be true of all law enforcement hirings, and rightfully so. However, when former employers refuse to disclose information regarding an applicant's prior employment history, it becomes more difficult for a law enforcement organization to evaluate whether an applicant meets these high standards.

Because some employers presumably base restrictive disclosure policies on an inaccurate assessment of their potential liability, this article discusses the extent to which public and private sector employers can be held liable for the disclosure of employment information. Specifically, this article examines whether an applicant's authorization to release personnel information affords immunity from defamation liability for former employers who disclose such information to a law enforcement organization.

The article begins with a brief discussion of the general principles concerning consent and immunity from defamation liability. Next, it examines two court decisions involving the use of release agreements to determine the scope of protection such agreements afford former employers who disclose personnel information to a law enforcement organization. Finally, the article offers several recommendations regarding the contents and structure of release agreements to achieve maximum protection. A sample release agreement is provided at the end of the article.

Consent Affords Absolute Privilege from Defamation

What is the legal significance of requiring an applicant for employment to sign an authorization for the release of personnel information? Does a release agreement afford former employers an absolute immunity from defamation liability for information disclosed pursuant to that agreement?

Dr. Schofield is a Special Agent in the Federal Bureau of Investigation and chief of the Legal Instruction Unit at the FBI Academy. This article previously appeared in the FBI Law Enforcement Bulletin (December 1996) 65 (12) 19-24. Request for reprints should be sent to the APA National Office, P.O. Box 8037, Chattanooga, TN 37414-0037.

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Courts generally afford employers an absolute privilege from defamation liability for disclosing employment information within the scope of a release agreement because a job applicant "... can consent to a defamation, and that consent creates an absolute bar to a defamation suit."¹ Courts and legal scholars recognize the efficacy of consent agreements and conclude that such agreements are not against public policy, even if they require job applicants to consent to an intentional tort, such as defamation.²

Consent creates an absolute privilege that is unaffected by a finding that a disclosure was made with malice, because an absolute privilege is intended to "... elevate the good to be accomplished by the free and open exchange of information over the harm which may result from a falsehood."³ Moreover, an absolute privilege prevents an inquiry into a prior employer's motive or purpose in disclosing personnel information pursuant to a job applicant's consent "... since this could result in subjecting the honest person to harassing litigation and claims."⁴

For example, the U.S. Court of Appeals for the Ninth Circuit in *Cox v. Nasche⁵* ruled that a release form signed by an applicant for government employment afforded an absolute privilege against a defamation action, even if statements of the former employer were made maliciously.⁶ Courts display a greater willingness to afford former employers absolute immunity where a person is applying for a law enforcement position for which the free flow of information may be especially important to ensure integrity and fitness for duty.

In that regard, the Supreme Court of New Mexico said a compelling reason for holding that consent creates an absolute privilege for information provided to the police is the need to ensure that only appropriate individuals with integrity and high moral character are employed in law enforcement positions.⁷ Because it is essential that law enforcement organizations acquire information about the background of applicants, the court said that granting absolute immunity to employers who supply such information "... makes possible the free flow of information vital to a law enforcement organization's ability to make responsible decisions regarding the fitness of its applicants."⁸

Courts Uphold Law Enforcement Release Agreements

The two court decisions discussed here involve defamation actions against employers for disclosing information about a former employee to a law enforcement organization. Both cases uphold the legal effectiveness of authorizations for the release of personnel information when disclosure is within the scope of a job applicant's consent.

In a case from New Mexico, a state police department recruit sued his former employer, alleging he was dismissed from recruit training as a result of his former employer's defamatory statements. As part of the application process, the recruit signed an agreement that allowed the state police to investigate his background and released from liability those who provided information to the state police under a guarantee of confidentiality.

The alleged defamatory statements made by the former employer included: 1) statements made to the state police characterizing the recruit as unfit for law enforcement because of emotional instability, dishonesty, drinking on the job, and resistance to authority; and 2) statements made to the offices of the Governor and the Attorney General characterizing the recruit as a security risk, a danger to certain individuals, and a person who has serious alcohol and drug problems and who exhibits extreme anger. The Supreme Court of New Mexico in *Baker v. Bhajan*⁹ ruled the statements made to the state police were absolutely privileged but found the disclosures to the Governor's and Attorney General's offices to be outside the scope of the applicant's consent.

In a case from Texas, a police department trainee in the Big Springs Police Department successfully completed police academy training but was terminated during field training because of poor evaluations from training officers. Several months later, the former officer applied for a job with the U.S. Marshal's Service (USMS) and completed, as part of the applicant process, a form authorizing persons contacted to give out information about job applicants. The form purported to "... release any individual ... from any and all liability for damages of whatever kind or nature which may at any time result to me on account of compliance, or any attempts to comply, with this authorization."¹⁰

A USMS investigator presented a copy of this authorization to the Big Springs chief of police, who then told the investigator about his dealings with the former officer. The former officer sued the chief for defamation after receiving a letter from the USMS stating that she was being rejected for employment because the chief had characterized her as having engaged in "irresponsible behavior." The Court of Appeals of Texas in *Smith v. Holley* ruled the consent agreement absolutely barred the defamation suit and was broad enough to immunize the chief from liability for the personnel information he disclosed to the USMS investigator.¹¹

Terms of Agreement Determine Scope of Disclosure Privilege

Both *Baker* and *Smith* illustrate the generally accepted principle that a job applicant's consent to the release of personnel information creates an absolute bar to defamation liability when former employers disclose information within the scope of the consent. In essence, the scope of the consent depends on the terms of the authorization-to-release agreement.

Consent as embodied in an authorization to release does not necessarily give former employers license to tell everything about a former employee to everyone. The disclosure of personnel information pursuant to a release authorization must "... not exceed what is reasonable in light of the language or circumstances that created it."¹² For example, a job applicant's consent for the release of personnel information to a law enforcement organization would not afford the former employer a privilege to disclose that information to a newspaper for publication.

Unsolicited Disclosures

The *Smith* court ruled that the disclosures by the Big Springs chief did not exceed the applicant's consent because he spoke only about the former officer's job performance and capabilities and only disclosed information to the USMS investigator. The court found that the broad and all-encompassing terms in the applicant's release agreement, in effect, said to the USMS: "You may find out what other people say about me, and I will not litigate if the responses are unfavorable."¹³

Conversely, the *Baker* court found the former employer's disclosures to the offices of the Governor and Attorney General exceeded the terms of the consent because the applicant only agreed to the release of information solicited by the state police under a guarantee of confidentiality.¹⁴ Thus, the former employer faces potential liability for these two unsolicited disclosures if they were made maliciously or for an improper purpose.¹⁵

Unanticipated Disclosures

Courts and legal scholars agree that a job applicant's consent does not immunize defamatory disclosures by former employers that the applicant had no reason to anticipate.¹⁶ However, it is not necessary that the defamed applicant know that the personnel information of which he consents is defamatory in character. Instead, it is enough that the applicant knows the contents of the personnel file or has reason to know that it may be defamatory.¹⁷

A job applicant who signs a release authorization thereby invites the disclosure of personnel information by former employers "... knowing that its contents may damage his reputation cannot complain when his fears come true."¹⁸ Accordingly, the *Smith* court ruled the disclosures by the Big Springs chief were not unanticipated because the former officer knew that the chief and others at the department held unfavorable opinions, about her performance at the department.¹⁹

Good managerial practices will help ensure that disclosures of personnel information are not unanticipated by former employees. These practices include: 1) limiting written disclosures to information contained in official personnel files; 2) limiting oral comments to information that is essentially coextensive with the information contained in official personnel files;²⁰ 3) affording employees regular and documented feedback on their performance; and 4) affording all employees procedural due process (*i.e.*, notice, reasons, and opportunity to respond) prior to all adverse personnel actions.

Another legal benefit of affording due process prior to adverse personnel actions was set forth in a June 1992 article in the *FBI Law Enforcement Bulletin*, which examined an employer's potential liability for disclosing information that infringes a former employee's constitutionally protected liberty interest.²¹ In essence, a liberty interest violation occurs only when the government disseminates stigmatizing and false information concurrent with an employee's termination. Accordingly, affording due process prior to final adverse personnel actions permits government employers to disclose all relevant personnel information to prospective law enforcement employers without fear of violating a former employee's liberty interest.

Disclosures by Persons Not Named in the Consent Agreement

Consent, whether expressed or implied, gives rise to an absolute privilege to disclosure. Consent is implied where circumstances show that a former employer's disclosures are relevant to the purpose for which a release agreement is used and is limited to the appropriate prospective employer.²²

In that regard, the former officer in *Smith* argued that the Authorization for Release of Information she executed did not specifically name the Big Springs chief and therefore, did not authorize his disclosures. The court rejected that argument by concluding that while a *release* for past tortious conduct might only be effective for specifically named persons, a consent to future conduct can be effective against unnamed persons.²³

Requiring specific names would render consent agreements less effective because there is no way that a general release concerning future disclosures could name all the unknown persons that a prospective law enforcement organization might want to interview. Moreover, the *Smith* court said that implying consent for the future disclosure of personnel information by unnamed persons promotes "... the candid exchange of information that is essential to our job market."²⁴

Prior Agreements Not to Disclose

Employers sometimes enter into contractual agreements with employees whereby they promise not to disclose certain personnel information in exchange for an employee's voluntary resignation. These agreements are used as an incentive to get problem employees to resign, thereby saving the employer from time-consuming and costly termination procedures and related litigation.

For example, after the former officer in *Smith v. Holley* appealed her termination from the police department, the Big Springs city manager entered into an agreement with her. This agreement stipulated: 1) that the Big Springs Police Department would reinstate her and then allow her to resign citing personal reasons; and 2) that the city would purge from its personnel records all references to the involuntary termination and would mark each page of her personnel file with a notice prohibiting the release to anyone by anybody of any information in her file except the date she was hired as a police officer trainee and the date she resigned for personal reasons.²⁵

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The *Smith* court concluded that this agreement by the city to keep secret the real reasons for the officer's departure from the police force did not preclude the disclosures made by the Big Springs chief pursuant to the authorization-to-release agreement. First, the court noted the chief was not a party to the city manager's agreement with the former officer and, therefore, was not personally bound by it.²⁶ Second, the court suggested that a broadly worded agreement like the one signed by the former officer authorizing personal contacts with individuals and the release of information would likely be sufficient to relieve former employers of an earlier contractual agreement not to disclose such information.²⁷

To ensure authorizations to release information are not limited by prior contractual agreements, law enforcement organizations should include specific language in release agreements making clear that the applicant consents to the release of that information. For example, the authorization for release of information upheld by the federal court of appeals in *Cox v. Nasche* contained a specific provision stating: "I Direct You to Release such information upon request of the duly accredited representative of any authorized agency *regardless of any agreement I may* have made with you previously to the contrary."²⁸

Conclusion

The fear of potential litigation and liability is apparently sufficient to make many employers uncooperative when a law enforcement organization requests they disclose employment information. Courts recognize a compelling public interest for employers to fully disclose all relevant information to a law enforcement organization conducting a background investigation on an applicant for employment.

Accordingly, courts afford absolute immunity to employers for disclosures pursuant to an applicant's consent, as embodied in an authorization-to-release agreement. Therefore, all applicants for sensitive law enforcement positions should be required to sign a release agreement that authorizes full disclosure of all relevant information and that provides maximum protection to those who disclose pursuant to the agreement, a sample of which can be found at the end of this article.

Endnotes

¹ See authorities cited in Smith v. Holley, 827 S.W.2d 433, 436 (Tex.App.1992).

 2 Id.

³ Id. at 439.

⁴ Id.

⁵ 70 F.3d 1030 (9th Cir. 1995).

⁶ The significance of an absolute, as opposed to a qualified, privilege is that an absolute privilege bars a defamation action, even for maliciously made statements. *Id.* at 1031, n.1.

⁷ Baker v. Bhajan, 871 P.2d 374, 378 (Sup.Ct.N.Mex. 1994).

⁸ Id.

Polygraph, <u>26</u> (1) (1997).

⁹ Id

¹⁰ Smith v. Holley, 827 S.W.2d 433, 435 (Tex.App. 1992).

¹¹ *Id*. at 436.

¹² *Id.* at 439.

 13 Id. at 440.

¹⁴ 871 P.2d at 378.

¹⁵ *Id.* at 379.

¹⁶ 827 S.W.2d at 440.

¹⁷ Id.

¹⁸ Bagwell v. Peninsula Regional Medical, 665 A.2d 297, 316 (Md.App. 1995).

¹⁹ 827 S.W.2d at 440.

²⁰ 665 A.2d at 316.

²¹ See Jeffrey Higginbotham, "Disclosure of Personnel Information--Constitutional Limitations," FBI Law Enforcement Bulletin, June 1992, pp. 26-32.

²² 871 P.2d at 377.
²³ 827 S.W.2d at 441.
²⁴ Id.
²⁵ Id. at 435.
²⁶ Id. at 440.
²⁷ Id.
²⁸ 70 F.3d at 1031.

Note: Law enforcement officers of other than federal jurisdiction who are interested in this article should consult their legal advisors. Some police procedures ruled permissible under federal constitutional law are of questionable legality under state law or are not permitted at all.

* * * * * *

Polygraph, 26 (1) (1997).

Sample Authorization for Release of Information Agreement

Law enforcement organizations can use this sample to develop their authorization-torelease information agreement. Any agreement should include space for the applicant's name, current address and telephone number, date of birth, and Social Security Number. All agreements should be signed and dated by the applicant and properly notarized.

TO WHOM IT MAY CONCERN: I am an applicant for a position with the ______ Department. The department needs to thoroughly investigate my employment background and personal history to evaluate my qualifications to hold the position for which I applied. It is in the public's interest that all relevant information concerning my personal and employment history be disclosed to the above department.

I hereby authorize any representative of the _____ Department bearing this release to obtain any information in your files pertaining to my employment records and I hereby direct you to release such information upon request of the bearer. I do hereby authorize a review of and full disclosure of all records, or any part thereof, concerning myself, by and to any duly authorized agent of the ______ Department, whether said records are of public, private, or confidential nature. The intent of this authorization is to give my consent for full and complete disclosure. I reiterate and emphasize that the intent of this authorization is to provide full and free access to the background and history of my personal life, for the specific purpose of pursuing a background investigation that may provide pertinent data for the ______ Department to consider in determining my suitability for employment in that department. It is my specific intent to provide access to personnel information, however personal or confidential it may appear to be.

I consent to your release of any and all public and private information that you may have concerning me, my work record, my background and reputation, my military service records, educational records, my financial status, my criminal history record, including any arrest records, any information contained in investigatory files, efficiency ratings, complaints or grievances filed by or against me, the records or recollections of attorneys at law, or other counsel, whether representing me or another person in any case, either criminal or civil, in which I presently have, or have had an interest, attendance records, polygraph examinations, and any internal affairs investigations and discipline, including any files which are deemed to be confidential, and/or sealed.

I hereby release you, your organization, and all others from liability or damages that may result from furnishing the information requested, including any liability or damage pursuant to any state or federal laws. I hereby release you, as the custodian of such records of organization, including its officers, employees, or related personnel, both individually and collectively, from any and all liability for damages of whatever kind, which may at any time

Employment Information Release Agreements

result to me, my heirs, family, or associates because of compliance with this authorization and request to release information, or any attempt to comply with it. I direct you to release such information upon request of the duly accredited representative of the _____ Department regardless of any agreement I may have made with your previously to the contrary. The law enforcement organization requesting the information pursuant to this release will discontinue processing my application if you refuse to disclose the information requested.

For and in consideration of the ______ Department's acceptance and processing of my application for employment, I agree to hold the ______, its agents and employees harmless from any and all claims and liability associated with my application for employment or in any way connected with the decision whether or not to employ me with the ______ Department. I understand that should information of a serious criminal nature surface as a result of this investigation, such information may be turned over to the proper authorities.

I understand my rights under Title 5, United States Code, Section 552a, the Privacy Act of 1974, with regard to access and to disclosure of records, and I waive those rights with the understanding that information furnished will be used by the ______ department in conjunction with employment procedures.

A photocopy or FAX copy of this release form will be valid as an original thereof, even though the said photocopy or FAX copy does not contain an original writing of my signature.

This waiver is valid for a period of _____ from the date of my signature.

Should there be any questions as to the validity of this release, you may contact me at the address listed on this form.

I agree to pay any and all charges or fees concerning this request and can be billed for such charges at the address listed on this form.

I agree to indemnify and hold harmless the person to whom this request is presented and his agents and employees, from and against all claims, losses and expenses, including reasonable attorney's fees, arising out of or by reason of complying with this request.

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Polygraph, <u>26</u> (1) (1997).

EXPERT WITNESS HANDBOOK

By

Dan Poynter

Santa Barbara, California: Para Publishing, P.O. Box 8206, Santa Barbara, CA 93118-8206, \$39.95.

Book Review

The United States Supreme Court decision in Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. _____, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993)(reprinted in <u>22</u> Polygraph 270), has ushered in a new standard for assessment of the admissibility of expert testimony. Already, a number of courts have, with mixed results, considered the admissibility of polygraph testing results under the Daubert standard. See, e.g., United States v. Galbreath, 908 F.Supp. 877 (D.N.M. 1995)(allowing the admission of polygraph evidence); Miller v. Heaven, 922 F.Supp. 497 (D. Kan. 1996)(rejecting admissibility of polygraph evidence); Chatwin v. Davis County, 936 F.Supp. 832 (D.Utah 1996)(although rejecting polygraph evidence admissibility in that case, it left open the potential admissibility upon proper showing of reliability). Consequently, there is an increased potential for polygraphists to be called to offer expert testimony regarding his or her examination or to comment on the testing of another polygraphist. Dan Poynter's recent second edition of his book Expert Witness Handbook, Para Publishing, P.O. Box 8206, Santa Barbara, California, 93118-8206 (\$39.95), is, therefore, particularly timely.

Mr. Poynter, a longtime litigation consultant and expert in the field of parachutes, offers a nuts-and-bolts introduction for potential witnesses. The book provides valuable tips and insights for both the novice and experienced testifying expert. Although written more for the expert who has voluntarily made himself available for litigation, consultation, and testimony, Mr. Poynter nevertheless offers the reluctant or non-volunteer expert valuable information that will assist in demystifying the litigation and testimony process.

Perhaps most valuable are the chapters addressing preparation for testifying in a deposition and at trial. These chapters take the potential expert step-by-step through the deposition and trial testimony process, to include information regarding notices of depositions, subpoenas, documents to take and not to take to the deposition and trial, how to prepare for deposition and trial testimonies, as well as a detailed summary of the types of questions that might be asked and tips on how to prepare for professionally responding to those questions.

HOW HONESTY TESTING WORKS

By

John B. Miner and Michael H. Capps

Westport, CT: Quorum Books, P.O. Box 5007, Westport, CT 06881-5007, \$59.95.

Book Review

This book is for security and personnel directors who choose to use honesty testing as part of the applicant process. The book is well organized for reading and reference, with straightforward writing and good explanations of the statistical material. The book explains validity as assessed by reviewers, how honesty tests are developed and validated, reliability of measurements, establishing cutting scores, question characteristics and advice on using the tests. There is ample attention paid to legal aspects, when used in the United States, including the topics of employment discrimination, privacy considerations, and the Americans With Disabilities Act. This is an excellent guide for the selection and administration of honesty tests. John B. Miner is a consultant and expert witness in the area of psychological testing. Michael H. Capps is Director of the U.S. Department of Defense Polygraph Institute and a past president of the American Polygraph Association.

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Book Reviews

FORENSIC PSYCHOPHYSIOLOGY, USING THE POLYGRAPH

Scientific Truth Verification - Lie Detection

By

James Allen Matte, Ph.D.

Williamsville, N.Y.: J.A.M. Publications, \$95.50 postpaid in U.S., J.A.M. Publications, 43 Brookside Drive, Williamsville, N.Y. 14221-6915.

Book Review

By

Norman Ansley

Overview

This major work by Dr. Matte exceeds in scope and depth every previous work on the detection of deception. It covers history, research, validity, test formats, test question formulation, stimulus tests, chart interpretations systems, conducting tests, countermeasures, testing sex offenders, and legal aspects. As a textbook it covers every topic in the curriculum of APA accredited schools except ethics. The book describes the format and use of most techniques other than relevant-irrelevant for screening and specific issues. The emphasis is on zone comparison technique, and predictably on Dr. Matte's quadri-Track and Quinque-Track Zone Comparison formats. The historical material includes information not previously published in context and suggests a significant revision of those school history plans based primarily on the 1939 work of Paul Trovillo. Polygraph research is thoroughly described and often included in other parts of the text where relevant. However, some readers might have wished inclusion of a more theoretical and philosophical approach instead of the sterile descriptive style. As a reference work for practicing examiners there is excellent material on technique, scoring methodology, question formulation, and even a massive collection of control questions, sorted by topics. There is a large glossary which may help establish standard terminology, but there is the disturbing introduction of an entirely new term, psychophysiological veracity examination or PV examination used throughout the book in place of the more common terms polygraph examination and psychophysiological detection of deception test, or PDD. I don't think Dr. Matte's PV examination will become common.

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In preparation of the book, Dr. Matte acknowledges direct assistance from 40 other experts in detection of deception, research, psychophysiology, pharmacology, school directors, program directors and instrument manufacturers. They provided material, made suggestions, and reviewed his drafts. Every chapter is followed by the references cited. An examiner who is planning to introduce polygraph results into evidence will profit by reading the legal chapter. Those seeking the lesser known formats such as Arther, Marcy and PCQT will find it in this work. A drawback of the book is an inconsistent organization of material and poor juxtaposition of chapters which may make it more difficult to use when assigning reading. However, few if any readers will pick up and read this 773-page tome from beginning to end. Most readers will take advantage of a thorough 65-page index.

Chapter Notes

One of the excellent features of this book is the frequent definition of terms, not just in the glossary, but at the beginning of many chapters. This is particularly useful in his introduction to validity. The treatment of research on validity and reliability is well documented and the major studies have been abstracted. By necessity abstracts leave out vital details, but space limits extensive descriptions. There are also some collections of studies included in the text. Some might prefer a little more overview and discussion of the meaning and trends found in the research, but the reader can do that from the extensive material.

The physiology section was written for examiners, and draws on authoritative sources. This chapter may become a principal source for physiological material in polygraph schools, particularly those in the IAFPI where the topic is treated seriously. His chapter is clearly written and well illustrated. His text puts physiological functions in the context of testing. In fact, he has a whole chapter devoted to the development of polygraph techniques in relationship to developments in psychophysiology.

In a chapter on problems in testing, Dr. Matte considers the relevance and briefly describes abnormal behavior, anxiety disorders, mood disorders, somatoform disorders, psychotic disorders, and dissociative disorders. He explains how these disorders will affect polygraph testing and the resulting charts. The disorder definitions conform to the 4th edition of the *DSM*. A discussion on psychopathy appears elsewhere in the text.

The chapter on question formulation briefly describes the pretest, then explains the questions used in the "Quadri-Track Zone Comparison" format, a test developed by the author. However, the question definitions for development and use are broad in applicability. There is an exception, and that is the definition and use of error questions (fear of error and hope of error), an interesting feature found only in Dr. Matte's formats. This chapter is followed by one on the theory of variables and how polygraph test formats address them. Where Dr. Matte discusses the differences in numerical and global or clinical approaches to testing, the author argues strongly for the numerical analysis and related test formats. His text also addresses the friendly polygrapher concept, use of biofeedback in countermeasure training, the issue of

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inclusive or exclusive control questions (Matte prefers the exclusive), verbal and nonverbal behavior, and the effects of race, age, personality and psychopathy on testing.

There is a thorough chapter on stim testing, perhaps more than necessary. He discusses placement of the stim test before or after the first relevant chart, and opts for placing it first. He describes how various stim tests are administered, and there alleged benefits. There are examples of charts. Unfortunately he neglects the views of past APA president Raymond J. Weir, Jr. which suggests that stim tests may not always be necessary or useful.

There is a chapter entitled "The numerical approach to PV examinations." It is a description of the Matte Quadri-Zone Comparison technique. The format is designed for single issue tests. There are forms, some a little hard to read, rules for administration and scoring, a predictive table for estimating errors and a comparison with the Backster Zone Comparison format. Also compared are the DODPI zone, the Integrated zone, and the Utah zone. Next, Matte describes his zone format for multiple issues, which is unusual.

There is a chapter on chart interpretation and a means for numerical quantification. The chapter is well-illustrated and has clear definitions. Matte has a section on analyzing the cardio activity monitor (CAM) tracing. He includes the current Backster rules for seven-point scoring, with an added rule by Matte called the "Dual-Equal Strong Reaction" rule. Matte also explains how to use his unique error questions in evaluating charts.

The chapter on computerized polygraph systems gives a brief historical account of their development, and describes the current Axciton, Lafayette, and Stoelting equipment. There is an interesting table comparing the three computerized instruments and related systems. There is also a history of the development of Polyscore by the Applied Physics Laboratory of Johns Hopkins University.

Matte has a useful chapter on control questions, which includes 19 pages of examples arranged by topics: Alcohol, arson, assault, homicide, bribery, burglary, child sexual abuse, children, conspiracy, employment, fidelity, fraud, larceny, malice, narcotics, paternity, police internal cases, property, rape, robbery, victims, general purpose, and relevant connected. Most of his examples begin with "Do you remember ..." He notes that a time bar may be added to create exclusive controls or omitted for inclusive controls.

The chapter on the Matte SKG test and the Backster SKY test could have been put in the chapter with their other techniques, but Matte makes the point they are different formats.

In a chapter on GKT, Matte describes the format and use of known solution peak of tension tests and searching peak of tension tests, and does not bother to differentiate them in methodology and scoring from the guilty knowledge test. For the known solution test he describes the use of a fictitious key at the number two position, which I believe was introduced by Richard O. Arther as a false key. Matte has renamed the searching peak, the Probing Peak

of Tension (PPOT). His examples and charts are useful. He includes a lengthy table to summarize the numerous laboratory research projects employing POT.

The following chapter treats the silent answer test as a separate format, rather than an integral part of the Reid test and used only in research with POT tests. The chapter on the effects of drugs is good, but the supporting research is negligible. In fact, little research has been attempted in this vital field, in part because the medical safeguards make it very expensive. Also negligible is the published research on countermeasures. In that chapter, Dr. Matte separates the topic into mental, physical, and pharmaceutical measures.

The chapter on legal aspects emphasizes the methods to be used in introducing polygraph results into evidence. Dr. Matte knows his case citation data will soon be obsolescent, so the emphasis is where it belongs. Of course, not everyone seeks admissibility, least of all the U.S. Department of Justice. There is an addendum to the legal chapter containing a study by Gary Light and John Schwartz on the relative utility of forensic disciplines. This, with the also cited study by Jan Widacki and Frank Horvath put the utility of polygraph tests in perspective. Testing under the EPPA rules is described in an Appendix.

The last chapter is on the use of the polygraph in sex crimes. It describes testing for probation, maintenance tests, and tests for full disclosure in support of therapy. There are directions for administering the tests and the results of some programs.

The appendices include one on chart marking, others on forms, a model licensing act, a 23-page glossary, and a list of APA accredited schools. The 65-page index is thorough and useful.

As a textbook for polygraph courses the book is excellent. Most examiners will also enjoy having this book within reach. Attorneys will find it a necessity.

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